SHIPBUILDING AND SHIPPING RECORD

A JOURNAL OF SHIPBUILDING, MARINE ENGINEERING, DOCKS, HARBOURS AND SHIPPING

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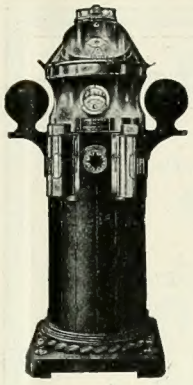

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VOL. VI. THURSDAY, JULY 1, 1915. No. 1.

CONTENTS.

American Trade with Germany.

WE have frequently pointed out that the rights and even the convenience of neutral seaborne commerce have been scrupulously respected by the British Government. This policy is evident in every line of the memorandum which has been communicated by the Foreign Secretary to the American Ambassador, and in which are set forth the measures adopted to eliminate the most considerable elements of hardship for neutrals in the restriction of the enemies' oversea trade. Had this country, in March, guided its immediate conduct by the adaptation of the rigid principles of blockade to the peculiar geographical situation and therein embodied the ideas underlying the doctrine of continuous voyage as developed by the American courts, undoubtedly American trade interests which had contracts actually in course of immediate fulfilment with Germany would have been gravely prejudiced. We had no desire to inflict grievous financial harm on these interests. We were equally determined that exports should not reach Germany. Take the case of cotton shipments. The only way in which we could accomplish both desires was to buy the goods from the American shippers. That we have done in regard to considerable consignments which left the United States up to certain dates in March. The Memorandum points out that the claims of the shippers have been met with promptitude. Likewise importers in the United States of goods purchased in Germany have had three months in which to clear off their purchases in enemy territory. When this policy is contrasted with the German ruthlessness we get a key to the failure of the latter to obtain any sympathy outside circles of Teutonic origin. The British Government claims no more than its due when it hopes that the United States Government will acknowledge the great consideration which has been shown to American interests. Various points of dispute about individual cargoes are now to be decided by the Prize Court.

Prize Courts Bill.

One comment on the Prize Courts Bill which was last week introduced in the House of Commons by the Attorney-General is obvious. It ought to have been brought forward months ago. Enemy ships have been seized and conducted to ports in British territories in various parts of the world. Their cargoes sometimes of a large and general nature, have not infrequently been owned by British, allied or neutral subjects, and originally destined for British ports. But owing to the exclusively local jurisdiction which the Prize Courts set up in those places exercise, they must retain the vessel within their jurisdiction until the claim has been adjudicated. The inconvenience of this arrangement is patent. The Bill is designed to enable a Prize Court to transfer the proceedings in regard to the capture of the vessel to the Prize Court having the jurisdiction at the port to which the cargo is destined It will then be possible for the ship to proceed on her voyage, and deliver her cargo.

Martinolich & Co.

The hitherto privately owned Marco U. Martinolich & Co., of Lussinpiccolo (Austria), has been formed into a limited liability company. The share capital is £315,000, of which £16,700 is subscribed by two banks, the rest being covered by the fleet of eight steamers. Shares to the value of £21,000 are assigned to the Austrian-Lloyd, which thus extends the influence it already exerted on free shipping due to its interest in the Navigazione Libera Triestina. The need for increased tonnage at its disposal was experienced by the Lloyd before the outbreak of war, and "a boom in freights is anticipated directly peace is declared." The eight vessels taken over by the new company range from 2,008 to 4,332 net tons register; two were built in 1911; two others in 1912, and the latest in 1913. The latter, the *Iris*, was launched by the Cantiere Navale Triestino (Monfalcone), and the seven older boats were built in Great Britain. The *Iris* and another steamer are in enemy hands, but not, it is claimed, as good prizes. The small yard operated by the Martinolich firm is not absorbed by the new company, but hopes gradually to expand. The new company took over the books at the beginning of the year, and an increase in capital is already contemplated.

Shipwrecked Charity.

Madras is often dubbed the "benighted presidency" mostly owing to inter-provincial jealousy. Calcutta, the premier city, is fond of disparaging other capitals, but, in the case of ambulance provisions, the despised city is an easy first, Bombay, Karachi and Rangoon well up, and Calcutta nowhere. The hospital ship *Madras*, found and equipped by that city, in the last of her many voyages brought 560 wounded from the Persian Gulf, of whom only four died on the voyage. She was refitted in seven days and then started back. Sir John Nixon, commanding the troops in Mesopotamia, has written to the Governor that "this hospital ship is a great boon to the sick and wounded and does honour to the head and heart of the members of Madras community who have so generously placed her at the disposal of the Army." There are plenty of rich men in the Bengal Presidency who are always ready to subscribe liberally to memorial statues, and so forth, with an eye to future honours. When, however, £14,000 was required for a glorified house-boat to be used as a base hospital in the amphibious warfare raging round and about the Garden of Eden, only £9,333 was promised and £2,800 paid up. However, the barge was fitted out by the marine department and, owing to delays in the work, was only ready to start in the teeth of the south-west monsoon. She was then sent off hurriedly, as it was alleged that a delay of three or four months—that is, to the end of the monsoon—would be fatal to the whole scheme. So hurried was her departure that the insurance was not completed. Her original name was *No. 13*, her crew numbered 13, and they were all saved by the heroic conduct of Captain F. G. Elliott, of the transport ship *Sikh*, which towed

her until she sank on May 17, in latitude 13° 13' N. east of Madras, seven days after she started from Calcutta.

The Morgan Combine.

The rumour is revived that the two committees representing the holders of the 5 per cent. and the 4½ per cent. bonds respectively which have the reorganisation of the International Mercantile Marine Company in hand, have made representations to the United States Government with a view to State control of the concern. As a matter of fact, it is understood that negotiations in this connection are responsible for the delay in issuing the reconstruction scheme. This movement is, indeed, closely associated with the one for the development of American shipping in the foreign trade, but in well-informed quarters it is not considered likely that it will succeed. There are many difficulties in the way, the chief of them being the agreement between the late Mr. Pierpoint Morgan and our Board of Trade concerning the British companies in the combine. This was arrived at in 1902 for a period of 20 years, and was made capable of further prolongation on five years' notice on either side, and as many of the vessels are now employed by the Admiralty for transport and other purposes it would appear to be impossible to carry out the American project. Among other things, the arrangement in question stipulates that the British companies shall remain British, not merely nominally, but in reality; that they shall be kept alive, and the majority of their directors shall always be British subjects; and that they shall be officered by British officers, and manned in reasonable proportion by British crews. In some quarters, however, the suggestion is made that the Board of Trade might waive their restriction in view of the assistance lent to the British Government by the Morgan group, although the idea is not one to which general credence is given.

Russian Shipping Facilities.

According to a message from the Petrograd correspondent of one of the daily newspapers, there appears to be an impression in some quarters that the advantages connected with the export of numerous Russian commodities required in Great Britain are lost because of the lack of shipping facilities between Archangel and the United Kingdom. This view is, however, entirely erroneous. At no time, in fact, have sailings been more frequent, in consequence of the inauguration of new services from and to our east and west coast ports. Unfortunately, so far as general trade is concerned, the accommodation at Archangel, greatly improved as it has been during the past few months, is to a very large extent monopolised by the movement of goods for the Russian Government. This is an urgent necessity and for some time to come there is not much chance of the situation in this respect becoming easier. The use, therefore, of the White Sea port, as well as of Vladivostock, from the traders' point of view is somewhat limited. To make matters worse several steamers have come to grief on the northern route since the re-opening of navigation this season. In a year or two other ports will, we understand, be available, but now that the passage to and from Russia via the Baltic has for the present been closed by the German fleet, the utmost importance attaches to the opening of the Dardanelles. As regards the export of Russian produce, almost everything depends upon freeing the Straits.

Disappearances at Sea.

Sometimes when a seaman disappears at sea no trace remains as to the manner in which he met his doom. Thus when his dependants claim compensation under the Workmen's Compensation Act, it is impossible to say with certainty whether the accident which caused his death arose out of or in the course of his employment. As we have pointed out more than once, the arbitrator has to fall back on inference, and the decisions of the appellate courts have allowed wide inferences on slender facts. Another of these cases of disappearance at sea came before the Court of Appeal last week. David Johnson Proctor, chief engineer of the steamer *Serbino*, on a voyage from Petrograd to Hull, in June, 1913, rose early one morning, and was last seen turning in behind the wheelhouse containing the steam steering gear. There had been some trouble with the propeller and other machinery, and it appeared that Proctor was anxious about the matter. It was suggested from this on behalf of his dependants that he had risen earlier than usual to examine the machinery and the state of the propeller, and that he had thus gone on duty and had lost his life while he was engaged in the performance of his duty. The County Court judge accepted this interpretation of the facts as the basis for his inference that the accident arose out of, and in the course of the man's employment. The Court of Appeal declined to disturb his finding. Compensation is thus given to the dependants. This is, therefore, another illustration of the latitude which in this class of cases the arbitrators possess in drawing inferences from surrounding circumstances.

German Shipbuilding Finance.

Shortly before the war German shipyards emerged from a long period of depression, few having realised good profits, and most of the large yards considerable losses between 1908 and 1912. From the military standpoint it was fortunate for the enemy that activity in his yards had been revived at the outbreak of war, and the latter has naturally augmented the favourable development. Seven large yards (for which the 1914 results are now known) distributed 4 per cent. dividend on £1,580,000 total capital in 1908; 4·9 per cent. on £1,710,000 in 1909; 5·5 per cent. in 1910; 6·1 per cent. in 1911, and 5·3 per cent. in 1912, still on the same capital; 7 per cent. in 1913 on a capital of £1,880,000; and 7·4 per cent. last year on £1,930,000 capital. Though this is the best aggregate realised by these seven yards during the past nine years, it is not to be assumed that the German shipbuilding industry as a whole is yet in a very favourable position. During the period 1908-14, two of the above seven yards averaged less than 1 per cent. dividend and the others averaged 3½, 4½, 6, 7 and 8·3 per cent. respectively. In other words, two paid fairly well, two moderately and three badly, and it is estimated that most German yards will need three more years as favourable as last year in order to wipe out the effects of the long period of depression.

The War and American Trade.

A writer in the *Atlantic Monthly* has much of interest to say in dealing with the present merchant marine problem, from the American point of view. He remarks that it was not easy to arouse interest in a mercantile marine under the American flag in an atmosphere in which imports were considered an economic mistake and large exports of manufactures deemed impracticable. This was all changed in the early days of August, and at once as by a revealing stroke two great weaknesses in the foreign trade of the United States burst plainly into sight. The first was the financial weakness and the second the shipping weakness of the country. Foreign trade it is true had grown to a total of over $4,200,000,000, and nothing speaks more strongly for the competing power of America than the fact that exports were much more than half this total, although those elements in export power were lacking which the great commercial rivals of America possessed in abundance. The writer further remarks that any state of affairs which places the transportation of American commerce during a European war chiefly in the hands of one side in such a contest is both humiliating and hurtful. It makes real neutrality of spirit and of practice more difficult and it places the belligerent, who indirectly may do harm without so intending, in a false position. The practical importance of this matter appears when we consider that by the excess of exports between September 1, 1914, and January 1, 1915, the Americans paid, in the form of goods, over $250,000,000 of their floating debt to Europe.

Marine Engine Economy.

It is generally recognised that marine reciprocating propelling machinery, including in that term boilers, engines, condensers, feed-heating plant and essential auxiliaries, has not improved in efficiency to the extent which might have been anticipated. This view is supported by the fact that 25 years ago one of the early triple-expansion engines was tested by the Research Committee of the Institution of Mechanical Engineers and found to be burning under 1·5 lb. of coal per i.h.p. This interesting statement appears at the outset of a paper entitled "Economy in Marine Engines, Some Suggested Improvements," which was contributed to the *Glasgow Herald* by Mr. A. Scott Younger, B.Sc., M.I.N.A., recently. We deal at greater length on page 5 with the contents of this paper, which constitutes an instructive review of the conditions which govern marine engine practice. At the present time the figure giving coal consumption in terms of indicated horse-power is claimed to be somewhat less than that referred to above in the case of the early triple-expansion engines, but at the same time the progress made in economy is not what it should have been or what the progress in land practice would have led us to expect. Some years ago the marine steam engine was more economical than the land engine, but now the positions are reversed, and the causes for the change are examined in the paper referred to on the basis of conditions of working and other circumstances which influence the matter in one direction and another.

U.S.S. "Downes."

The recently published results of the trials of the United States torpedo boat destroyer *Downes* provide some interesting reading. Among other points it is stated that the contractors guaranteed that the fuel oil consumption per knot run for all purposes, including that necessary for all auxiliaries in use on the trials, would not exceed 700 lb. at guaranteed maximum speed, 460 lb. at 24 knots, 210 lb. at 15½ knots, and 175 lb. at 12 knots. The consumption of the fuel oil at these speeds was to be determined by the Trial Board from a curve based on the rate of fuel oil consumption on trials undertaken to determine other points. According to the trial data, with the exception of the consumption at the highest speed which slightly exceeded the allowance, an appreciable economy was reached at the lower speeds. The standardisation trial was successfully run on the measured mile course off Delaware breakwater. In all, 27 runs were made at various speeds. From the data obtained it was found that 567·6 r.p.m. of the propellers were required to attain the designed speed of 29 knots, 409·9 r.p.m. for 24 knots, 250 r.p.m. for 15½ knots and 192·6 r.p.m. for 12 knots. The *Downes* is a twin-screw vessel fitted with a combination of Curtis turbines and reciprocating engines and designed for a speed of 29 knots at a displacement of 1,072 tons, with main engines developing 16,000 s.h.p. The contract price was £155,500, with delivery in 24 months. The reciprocating engines are designed for cruising below 15½ knots and are coupled to the turbines by a mechanical clutch, which can be thrown out of gear for higher speeds.

Vagaries of Trial Results.

One of the most perplexing problems which naval architects are occasionally called upon to explain are the inconsistent results which are obtained by ships built exactly alike. Several such cases might be cited, and no evident reason exists for such differences. For example, two large vessels, sister ships, had the following peculiar results:—The first went on trial in midsummer and obtained a certain speed with a particular power, whilst the second run her trials in the early winter, and with 10 per cent. less power attained a tenth of a knot greater speed. In another instance a fast cross-Channel steamer obtained almost a knot more speed than her sister ship with almost the same power. It is well known that considerable error may creep in, in the determination of the power developed. Prof. Peabody has expressed the opinion that this may be 5 per cent. in error. The same authority has said that after having spent a number of seasons in making progressive trials under ideal conditions he is surprised that progressive speed trials come out as close as they do rather than they are not any better. A most peculiar result was given by an American battleship which some time ago was tried with bilge keels. The bilge keels were afterwards removed and the ship was tried over the same course, at the same displacement and same conditions as nearly as possible, and the ship took several hundred more horse power for a given speed with the bilge keels off. The explanation given of this peculiar result was that the ship did not steer nearly so well after the bilge keels were removed, and in running a trial, in trying to keep a straight course, they used more helm with the bilge keels off than on. The few degrees more helm caused a decided increase in the resistance. This instance gives weight to the opinion that careful steering is a necessity during trials and has an important bearing on the results obtained.

Bulkhead Doors.

The desirability of reducing the number of doors in watertight bulkheads is impressed in the report of the Bulkhead Committee. The total abolition of these is advocated by many authorities, but considerable inconvenience would be incurred in the working of ships were these prohibited. Larger staffs would be necessary in the machinery sections and intercommunication between these sections would be difficult. Stringent regulations are laid down about the opening and closing of watertight doors, but the enforcing of these will be an impossible task. In service they are apt to be left open for long periods and are frequently found to be unworkable when the emergency comes. These facts caused several ships of the United States Navy to be built without any watertight doors in the transverse bulkheads in the machinery spaces. Experience showed, however, that the pressure of daily inconvenience overcame the improvement in safety, and in the course of time every one of these ships had doors in the bulkheads dividing the machinery sections. The practice of the British Admiralty is to allow no doors in transverse watertight bulkheads under the protective deck, and from this it may be inferred that the amount of inconvenience caused by the absence of watertight doors is considered to be of no moment when the probable safety of the ship is at stake. A great amount of ingenuity has been directed towards the design and construction of watertight doors, and under normal circumstances, if these are given a reasonable degree of attention, they should be effective, but experience shows that these always constitute a danger under any system of closing. They may be interfered with wilfully, by malice or some other reason, or they may be unable to be closed through the bulkheads warping as in the ill-fated *Victoria*. Undoubtedly keeping watertight bulkheads intact would add materially to the safety of ships.

Modern Methods in Shipbuilding.

Attention has been drawn to the necessity for modern methods of dealing with the ironwork of vessels, in a contemporary devoted to the subjects of shipbuilding and engineering. The writer speaks with authority and his remarks are worthy of more than passing notice. It is considered that in full ships particularly it is possible to have a great number of the plates of rectangular shape and many of the same actual length and width. In a given case a group of 32 shell plates were identical in size and thickness, as also were another group of 22. It is admitted that full ships with long flat sides and bottoms are most applicable to such treatment, but in most vessels it could be carried out to a considerable extent. Decks, inner bottoms, and bulkheads are particularly suited for obtaining uniformity in sizes of plates. In order to take advantage of this uniformity the introduction of a

machine known as an automatic spacing table with multiple punch equipped with gag control mechanism is necessary. Instead of from 2,500 to 3,000 holes per day punched by a gang under the old methods this machine has the astonishingly large output of from 60,000 to 80,000 holes per day. This is accomplished with no increase in the labour necessary under the old system. Some of these machines are capable of punching 18 holes at one stroke and can be made for any capacity and size of work. It can readily be seen that the uniformity in the sizes of shell and deck plates which was advocated will accelerate the manipulation of this multiple punch. The fluctuation in the output of from 60,000 to 80,000 per day depends entirely on how often a change is necessary in the gag control to suit the different sizes of plates. This multiple punching machine is an American invention, and is in use in some of the yards on the other side. We are not aware whether anything more than a single punch has been used for ship plates in British yards, but the idea seems to be worthy of consideration as the saving in time and money which must accrue from such an advance in production must be very considerable.

THE MUNITIONS OF WAR BILL.

THE Munitions of War Bill does not differ in any essential detail from the forecast of its provisions which we gave in our issue of last week. Existing or apprehended differences between employers and employees engaged in the manufacture or transport of war material, or in other industries which may be proclaimed by His Majesty to be necessary in the interests of the nation, are to be reported to the Board of Trade, which will have the power to require them to be adjusted by means of current agreements between employers' associations and trade unions, or to order them to be submitted to arbitration in accordance with the Treasury Agreement. Three arbitration tribunals are, it will be recalled, set up by that document: (1) The Committee on Production in Shipbuilding and Engineering Establishments; (2) a single arbitrator agreed upon by the parties or in default of agreement appointed by the Board of Trade; (3) a court of arbitration consisting of an equal number of persons representing employers and persons representing workmen, with a chairman appointed by the Board of Trade. The tribunal to which references are made is to be determined by agreement between the parties to the difference or in default of such agreement by the Board of Trade. Lock-outs and strikes are to be prohibited.

The Minister of Munitions is to have the power to declare any establishment a "controlled establishment," in which the profits of the employers shall be limited, and all rules, practices, and customs not having the force of law which tend to restrict production or employment shall be suspended. Any person who incites or encourages any employer or person employed to comply or continue to comply with rules, practices or customs of the kind shall be guilty of an offence under the Act. The obligation of the owners of "controlled establishments" to restore the exact pre-war conditions of employment when the war comes to an end is to be given the effect of law. Clause 4, Section 4, says they "shall be deemed to have entered into an undertaking to carry out the provisions set out in the Second Schedule of this Act." The Second Schedule is taken literally from the Treasury Agreement.

The net profits of a "controlled establishment" are to be "the average of the amount of the net profits for the two corresponding periods completed next before the outbreak of war," plus a fifth. If, however, it is represented in any case to the Minister of Munitions that the net profits of all or any other establishments belonging to the same owner should be brought into account, or that the prescribed standard is unfair, the Minister may allow the other net profits to be reckoned, or substitute for the average such an amount as may be agreed upon with the owner of the establishment, or refer the matter to a referee or board of referees, whose decision shall be final.

The only allusions in the Bill to the voluntary scheme under which skilled men undertake to serve in "controlled establishments" to go, that is to say, wherever the Minister of Munitions deems their services to be necessary—are to the penalties which may be imposed for breaches of obligation. It is also to be an offence for employers to dissuade or attempt to dissuade men from volunteering, or to retain or offer to retain in their service workmen who have volunteered. Nor must employment be given to men whose last employment has been in a "controlled establishment," unless they hold certificates from their previous employers that they have left with consent, or certificates from munitions' tribunals that consent has been unreasonably withheld, or unless a period of six weeks, or "such other period as may be provided by order of the Minister of Munitions . . . has elapsed since they left their last previous employment."

The undertaking which volunteers are to give is not, of course, in the Bill. In order, however, to make the position clear, it may be given at this point. It is as follows:—

In accordance with arrangements which have been made with the Minister of Munitions by the National Advisory Committee acting on behalf of the trade unions, I undertake with the Minister of Munitions to accept employment on making munitions of war in such controlled establishments as may be named by him and to remain in such employment during the war for so long as required (not exceeding six months in all) subject to the conditions set out on this form.

(1) The rate of wages paid will be that of the district to which the workman is transferred, provided that if in any case the workman proves that this is less than the rate he was receiving before enrolment he shall be entitled to receive such higher rate.

(2) The workman shall receive over and above his wages the following allowances—(a) If brought from a distance beyond that which he can reasonably travel daily, railway fare at the commencement and completion of the work for which transferred, and where necessary subsistence allowance at the rate of 2s. 6d. per day for seven days per week. It is clearly understood that the subsistence allowance is not intended to enable any workman to make a profit; (b) if within daily travelling distance (exceeding half-an-hour each way) the value of workmen's tickets and one hour's travelling time per day at the rate of time and a half; (c) if within daily travelling distance (not exceeding half-an-hour) the cost of workmen's tickets. Subsistence and travelling allowances will be paid by the firm employing the workman with the wages.

(3) The workman may volunteer for a further period of employment after the completion of the period for which he is required in the first instance.

(4) Any workman transferred from employment under this undertaking shall, if found suitable, be guaranteed employment during the war for a period not exceeding six months.

I agree that any breach of this undertaking may be dealt with by a Munitions' Court consisting of a chairman appointed by the Minister of Munitions with assessors equally representing employers and workmen which may, if it thinks fit, impose a fine not exceeding £3.

The officer in charge of the Munitions' Works Bureau will send the following circular letter to the volunteer's employers:—

The workman whose name is given on the attached form has enrolled himself as a war munitions volunteer, thereby undertaking to place himself at the disposal of the Minister of Munitions for transfer to Government work. It is a condition of enrolment that the workman was not at the time engaged on Government work. If, however, he is now engaged on Government work, or if for any reason you wish to submit for the consideration of the Minister of Munitions a request that the workman shall not be transferred, I am to request that you will be so good as to fill up the form attached to this letter and return it to me at the earliest possible moment. If the form is not received within three days it will be assumed that you do not feel justified in objecting to the transfer of the workman. It is requested that your reply may be confined to filling up the form.

The form contains several suggested reasons for objections to the transfer. One is that the volunteer is engaged on Government work for which no other suitable operative is available. Another is that, although the volunteer is not engaged on Government work, his transfer would involve the dismissal of other skilled men or other unskilled men. There is also a space for "any other reason."

Power is sought in the Bill to substitute the following for paragraph (*d*) set out in sub-section (1) of Section 1 of the Defence of the Realm (Amendment) (No. 2) Act:—"(*d*) To regulate or restrict the carrying on of any work in any factory, workshop, or other premises, or the engagement or employment of any workman or all or any classes of workmen therein, or to remove the plant therefrom with a view to maintaining or increasing the production of munitions in other factories, workshops or premises." The Minister of Munitions is further to have the power to require "the owner of any establishment in which persons are employed" to state the

numbers and classes of their workpeople, the numbers and classes of their machines, the nature of the work in progress, and "any other matters with respect to which" he "may desire information for the purpose of his powers and duties."

The penalty for failure to comply with an award is to be for workmen £5 a day, and for employers £5 a day for each man affected. For locking-out the penalty is to be £5 a day per man, and for striking £5 a day. The penalty for breaches by the volunteer of his undertaking and also for breaches of the regulations governing "controlled establishments" is to be £3. For breaches of "any other provision of this Act" the penalty is to be £50.

That the Bill will go through exactly as it stands is improbable. The standard of profits to be set up for "controlled establishments" leaves a good deal to be desired from the point of view of employers. The trade unions, on the other hand, are very generously treated, considering that they have been to date the great obstacle to augmentation of the output of munitions. Still, it need not be ignored that if they stand to be large gainers by the passing of the measure they also run a risk of losing heavily. If the voluntary scheme does not result in the enrolment of a sufficient number of skilled men there will be what they call "industrial conscription."

THE CART NAVIGATION.

A DECISION, which is of great importance to the shipbuilding firms in Paisley and to the trading concerns in the district, has just been given in the Scottish Law Courts. It relates to the control of the River Cart, which, if shipbuilding is to be continued on its banks, must be kept in such a state that the vessels constructed there can be floated to the Clyde and thence to the sea. The financial difficulties into which the Cart Navigation fell dates back for a good many years. In 1904, a judicial factor was appointed on the undertaking for the purpose of rendering the security of the mortgage holders effectual, the application being made by a creditor in a mortgage issued by the Cart Trustees under the Cart Navigation Act, 1890. The Trustees borrowed over £90,000 under a prior Act of 1885, and they borrowed about £24,000 under the Act of 1890. Prior to 1890 the Cart Trustees commenced to levy under their statutory powers a guarantee rate from the town of Paisley in aid of the mortgage debt. Notwithstanding this rate the Trustees suspended payment of interest on the 1885 mortgages in 1891. No interest was paid on the 1890 mortgages. The guarantee rate was only leviable for 25 years and its collection expired in 1913. The ordinary revenue of the undertaking has not for some time been sufficient to meet the ordinary expenditure. The judicial factor, who held a sum of over £10,000 in his hands, realising that that sum, the proceeds of the guarantee fund, might disappear if applied in meeting deficits on the working of the undertaking, approached the Town Council of Paisley with a view to getting them to reappoint the Cart Trustees, whose election had fallen into abeyance in consequence of the appointment of the judicial factor, as he thought he ought to discontinue the management of the undertaking as no longer in the interests of the mortgage creditors. He therefore presented a note to the Court recently for power to discontinue the undertaking and for his discharge. The shipbuilders on the river and certain other authorities opposed the application on the ground that they were entitled to have the administration of the Cart Navigation maintained and that the guarantee rate in the factor's hands was answerable for the fulfilment of the statutory obligations of the Cart Trustees to keep up the Inchinnan Swing Bridge and the navigation generally. A number of mortgage holders also presented a petition to the Court for an order upon the burgh of Paisley to re-constitute the Cart Trust, for the recall of the factor, and for the distribution of the guarantee rate among the holders of the mortgage debt in accordance with their priorities.

The Court found that the mortgage holders and the factor were entitled to the relief craved in the petition and accordingly the Town Council of Paisley was appointed to take steps forthwith for the resuscitation of the Cart Trust, and the factor was directed to lodge a scheme of ranking and division of the funds in his hands. The Lord President of the Court of Session, in a note, stated that the judicial factor had come to the conclusion that it was impossible for him to carry on the undertaking with any benefit to the mortgage debenture holders, and in his opinion the time had now arrived when, in the interest of the mortgagees, he should discontinue the working of the undertaking. They were informed that there was not the faintest prospect of the debts of the concern, not even the interests on the debts, which now amounted to over £19,000, being paid. It was conceded that this undertaking, though waterlogged, ought not to be left derelict, and in order to avoid that result it appeared to his Lordship that no better means could be devised than to revive the Cart Navigation Trust, for after all that body had only been temporarily suspended in its administration by the judicial factor's appointment. When that body was revived and was once more in the control of the administration it would be for it to determine questions of future policy which lay outside the domain of a judicial factor appointed for a limited purpose.

ECONOMY IN MARINE ENGINES.

MR. A. SCOTT YOUNGER, B.Sc., M.I.N.A., contributes an interesting article to the *Glasgow Herald* under the heading of "Economy in Marine Engines: Some Suggested Improvements." The author asserts at the commencement that the marine engine and its auxiliaries have not improved in efficiency to the extent which might have been anticipated. The early relative economy of marine engines was due to the shipowner who, knowing the importance of low fuel consumption, insisted upon obtaining the latest improvements which at the then existing state of development were clearly recognised as such.

Since those days, he contends, there has not been any one development in marine reciprocating engine practice sufficiently striking to arrest and focus the attention of the shipowner, and it is generally recognised that no improvement at all comparable in importance to the invention of the compound and the introduction of the triple-expansion engine can be looked for. There have, of course, been many improvements in marine engine practice, the collective effect of which is very important, but their value remains unknown to the shipowner and will remain so until he determines to test them accurately on modern lines. Perhaps one of the greatest of these improvements was the introduction of the contact-feed heater. This apparatus, apart from the increased engine efficiency it affords, has done more to stop boiler corrosion than all the other devices put together. Other advances consist of improved systems of feed heating by utilising exhaust steam, the maintenance of constant vacuum by improved condenser and air pumps, better drainage of cylinders, use of boiler circulators, &c. But while each of these contribute something to the whole the exact effect of each is unknown, and the benefit of some of these devices is questioned by some engineers. The author states that it is this ignorance of the results produced, on the part of the shipowner, which has resulted in stagnation that can only be removed by some adequate system of testing.

He suggests the following tests as of immense service to builders and owners as giving reliable information on the following points:—

1. The mechanical efficiency of the engine.
2. Best vacuum for marine reciprocating engines.
3. The advantage of well drained cylinders.
4. The efficiency of lagging the tops and bottoms of the cylinders.
5. The enormous gain by properly utilising auxiliary exhausts instead of putting them into the main condenser.
6. The value of boiler circulators.
7. The economy of superheating.

A reliable figure could be obtained for the b.h.p., namely, brake or useful horse-power in terms of indicated horse-power, water

consumption and fuel, and this would be a constant guide for the chief and superintendent engineer in checking voyage results.

At the present time the horse power is given by the chief engineer in terms of coal consumption. This is entirely misleading because no reliable means exists for measuring the quantities. The usual practice is as follows: A doubtful quantity of coal of unknown composition is divided by an unreliable measure of indicated horse-power, and the result is claimed as the performance of the engine. Such claims he maintains are quite absurd, but in the absence of data obtained by actual measurement they cannot be checked.

The performance of the boilers could also be checked by carefully measuring the coal and analysing its composition. The gain to the shipowner would be that he would have absolutely reliable data by which to check the future performances of his engine. He would also have the advantage of possessing an engine fitted with the latest improvements whose value had been ascertained by tests, and the resulting economy would extend throughout the life of the ship and return him many times over any increase in the initial outlay.

The author concludes by remarking that those builders who adopted the practice of introducing proper tests during the trials of marine engines would soon become known through the excellence of their work and they would know to what the economy was due and how much should be contributed to each item.

PUBLICATIONS RECEIVED.

[A short notice of any publication does not necessarily preclude the subsequent appearance of a longer review.]

First Principles of Production. By J. Taylor Peddie, F.S.S. London: Longmans, Green & Co. 8 in. 5 in. 231 pp. Cloth, 5s. net.

This is a contribution to the science of economics in which the author appeals for a more scientific conception of the various factors which make commerce and industry what it is. He points out that the reduction of credit values and wages in Germany, which will take place in that country when she begins industrial operations again, means that her costs of production will be on a much lower level than those which prevailed prior to the declaration of war. Germany and Austria will have to live to pay their debts, and it follows, therefore, that competition for international trade at the conclusion of the war will be keen and strenuous. The great advantage we have by way of compensation is the breathing space which is now afforded us of putting our working conditions in order. To accomplish this the author pleads for a scheme of national economics in which shall be shown the value of the services which science has rendered and can render to industry. It is the evolution of this idea which forms the basis of the volume under review to which Mr. S. Roy Illingworth, Sir Norman Lockyer (with notes by Prof. R. A. Gregory), Mr. Wm. Lorimer and Prof. Percy Frankland add informative contributions.

Greek Shipowning.—The following information, appearing in the *Board of Trade Journal*, is from the report by His Majesty's Consul at Piræus (Mr. W. J. Norcop) on the trade of that district in 1914, which will shortly be issued:—One of the most remarkable and striking phases in the development of Greece has been the steady expansion of the Greek mercantile marine within the last 20 years. The number of vessels comprising the merchant fleet of Greece at the end of 1903 was 210 steamers, with a combined tonnage of 202,140 tons, and at the end of 1914, according to *Lloyd's Register*, it numbered 440 steamers with a tonnage of approximately 900,000 tons, viz.: 4 vessels of over 6,000 tons, 15 vessels of over 4,000 tons, 84 vessels of over 3,000 tons, 134 vessels of over 2,000 tons, and 202 vessels of under 2,000 tons. The increase in shipping rates since the South African war has contributed largely to the development of Greek merchant shipping, and certainly has had an extraordinary influence on the economic, and particularly on the monetary, situation of the country.

GERMAN SHIPPING ASPIRATIONS.

In a pleasant article dealing with the "fate of British commercial predominance," *Hansa* announces that "the whole heart and soul of John Bull is concentrated in the words 'shipping and commerce'." Further, that London has been the hub of the commercial universe, but is no longer to be, after the war, and "it is already time to prepare by deliberation what will later be crowned by action." German commerce and shipping demands "free movement on the world stage," and London is no longer to be the first clearing house for German international trade. The "mighty German economic bodies" co-operating with those of all Central Europe must form an independent organisation. German banks taking over the *rembours* for German overseas trade. Hamburg and Bremen are to become financial centres of the first magnitude, and Germany, and a Central and Northern Europe dependent on German shipping, are to lead the world independently of London.

In stating that German colonies have the greatest interest in trading directly with Germany and in then proceeding to enumerate the products of those colonies and the "tribute" they have paid in the past to England and France and should in future pay to Germany, in the way of insurance and cable charges, &c., the writer appears to be labouring under a rather fundamental delusion. It is as well to remember, however, that German methods and measures in countries which are not their own take no cognisance of the latter fact, unless by way of altering it. In the article under review, the writer is careful to explain that where the direct interest and control of German importers and consumers are insufficient to secure cargoes for German bottoms (as, for instance, where the produce of foreign colonies is concerned), much can be done by German commercial settlements and by the activity of German banks and insurance companies. Whatever the moral standard of their past practices, it must be admitted that German industry in all its branches has practised and profited by the precept that "Unity is strength," and has shown a capacity for ramified intrigue which need not be imitated but must be taken into account.

With quite characteristic modesty it is asserted that German shipbuilding art and industry are "not only freed from England but excel British products in mastery of execution. *Lloyd's classification is for us unnecessary.*" (The italics are ours.) German owners, harbour equipment, personnel and methods are superlatively the best. This being so, the way is clear to independence of London, and Hamburg and Bremen are appointed in its stead.

Our predominance in tramp shipping being briefly outlined, the writer is constrained to admit that it cannot be at once supplanted; indeed, he makes no definite suggestions as to how the feat is to be accomplished. However, he comforts his readers by repeating at intervals that "where there's a will, there's a way," counsels "vigorous action" and suggests that German and associated Continental markets are sufficiently extensive to make it possible for German importers to secure cargoes for the German flag. Hanseatic brokers are to take over business hitherto placed in London, German shipyards are to be kept busy on mercantile work, and—the inevitable consideration in every phase of German existence—the larger merchant fleet and crews would be of great military importance.

Rhenish-Westphalian Iron Market.—According to a German contemporary, all works are very fully employed, longer and longer delivery dates are given, and convention prices are frequently overbidden—*e.g.*, £7 or £7 10s. per ton for bar iron, for which the convention price is £6 15s. Similarly, the convention price of £7 to £7 5s. for sheet is often overbidden by many shillings. From £8 10s. to £8 18s. is obtained for fine sheets. Mannesmann tube fetches 5 to 10 per cent. higher than convention prices. It is increasingly difficult to obtain delivery of other than war material, and it is said that the cessation of export to Italy will have little influence on the iron market owing to scarcity of material and the impossibility of considerably increasing output.

THE FAILURE OF THE PANAMA CANAL CRANE "AJAX."

It is probably within the recollection of our readers that the Deutsche Maschinenfabrik A.G., of Duisburg, Germany, constructed two floating cranes, the *Ajax* and *Hercules*, for the Panama Canal authorities, and that while the *Ajax* was under test on December 7 last the jib failed and collapsed. The results of the investigation into the cause of failure have been published in the official *Canal Record*, from which we take the following particulars.

The crane consists essentially of a pontoon carrying a fixed tower surrounded by a revolving frame structure which carries the jib. The pontoon is 150 ft. long by 88 ft. wide, the tower rises 66 ft. from the deck to the jib pivot, and the jib is 143 ft. long. When elevated to the highest angle, the jib outriggers reach 206 ft. above the deck. The entire weight of the superstructure and the hook load is carried by a bearing at the top of the fixed tower, and the overturning moment of the weights and loads is resisted by a horizontal force at the top of the fixed tower, and an equal but opposite horizontal force at the foot of the tower. The construction of the pontoon is such as to make it an efficient box girder for carrying the stresses.

The testing of the *Ajax* began on December 3. By the terms of the contract, the contractor was responsible for the conduct of the tests. The proposed capacities for the main hoist were, for long tons:—

	100 Tons.	150 Tons.	250 Tons.
Loaded reach over end	81·0 ft.	59·3 ft.	21·4 ft.
,, ,, ,, side ...	82·4 ft.	63·6 ft.	24·2 ft.

The time of hoisting main loads was to be as follows:—

Tons.	Per minute.
250	3 ft. 6 in.
125	7 ft.
62½	14 ft.

The crane withstood successfully the 100-ton normal load test. The hoisting speed, luffing speed, and slowing speed were measured and the contract requirements were met.

On December 7 the test load was increased by 20 per cent., as specified by the contract for the overload tests. The 120-ton load was hoisted clear of the wharf and luffed slowly out to the 100-ton reach, that is, to a reach of 81 ft. from the face of the fender. No sign of distress was noted in any member. It was noted that the auxiliary hoist trolley was at the inner limit of travel, when, according to the contract, it should be at the tip of the jib for the maximum loads. The jib was to be luffed in so that the trolley could be run out, but the instant that the controller was placed in the luffing position, and the brake solenoids heard releasing the brakes on the drums, rivets were heard snapping aloft. Broken rivets began to fall. Then two movements were observed: the collapse of the back of the jib, and the fall of the load, which was only a short distance above the ground; and then after a pause, the fall of the jib and the recoil of the pontoon.

A simple diagram of the jib, with the principal members numbered, is shown in the next column. The members of which the numbers are encircled received maximum stress in the 100-ton position.

The jib pivot remained intact and the jib in its fall turned about this pivot. The head of the jib, with the sheaves which support the main load, swung clear of the test load and buried itself about 6 ft. in the ground. The extension of the jib beyond this point, which serves as an attachment for the trolley sheaves, struck the test load and was completely wrecked.

The lower chord was bent up at the second panel point from the pivot and the top chord was bent down at the first point on the top chord. The top chords were bent down until the upper eyes which hold the connecting link pins were brought down over the jib pivot eyes, but in back of same and towards the left.

Struts No. 29, which take the compression between the upper pin and the pivot on the jib, were bent outward; sharp bends occurred in both cases near the points of connection and at these bends the built-up channels forming the cross-section of the strut were crushed together. The sharp bend at the upper connection consisted of a bend in both directions; at the lower connection the strut was doubled upon itself.

Strut No. 27 on the right side broke clear of the upper chord at the connection and was not crushed; on the left side the connection held at top and bottom but the strut was crushed.

Members Nos. 23 and 21 were bent inward. The portal which ties the upper chord together at the first panel point and supports the guide sheaves for the main hoist remained in place. The connecting links from jib to crosshead were badly twisted.

The spindle carriage track was sprung outward, the spindles with it; but the spindles suffered no injury.

The main hoist blocks and the equaliser bar were injured, the latter especially, but the block sheaves were intact. Of the 10 upper sheaves at the head of the jib, only two were broken. The ladders, walks, railing, &c., were bent and the trolley track was badly twisted and bent. The jaws of the revolving superstructure which form the jib pivot were twisted and the outer cover plate was ripped. The inner part of the trolley track penetrated the operator's cab and injured the controllers and instruments. The hoisting cable was kinked in places and rendered unfit for use.

The jib is a framed structure consisting of two trusses, each as shown in the accompanying diagram. The lower chords of the trusses are connected by cross bracing, but the plane of the upper chords is devoid of cross bracing, except for a portal at the first panel point from the inner end. There are cross frames in the

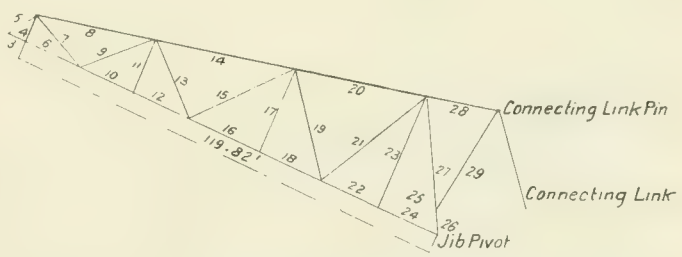


Diagram of the Jib which Collapsed, showing points of Principal Stresses.

planes of members 4, 11, 17, and 23. Cross bracing in the plane of the upper chords was purposely omitted to secure flexibility, the idea being that while the jib is symmetrically loaded, equal tension in the connecting links is assured. If the jib were a rigid structure and the alignment not perfect, a condition could be conceived in which one truss and one connecting link would be forced to carry an excessive percentage of the whole load. There is no cross bracing in the plane of member No. 29, due to the necessity of allowing that portion of the jib to pass on either side of the girder which supports the "bell," or revolving structure below the jib, which carries the winch house, operator's cab, &c.

The point at which the connecting links act, the intersection of members Nos. 28 and 29, is therefore not braced against lateral stresses, bracing, although desirable, not being thought necessary by the designer. The pivots of the jib are provided with spherical bearings to enable them to adjust themselves should both pins not be on the same axis. The designer of the crane frankly endeavoured to keep down the weight of the jib without exceeding the specified unit stresses, since the weight of this portion of the crane affects the whole structure.

The consensus of authoritative opinion from the viewpoint of the Panama Canal is that member No. 29 was the first member to fail, and that this failure was due, not to deficiency in sectional area, but to insufficient provision of latticing, batten plates, &c., to tie the two parts of the member together. Paragraph No. 116

of the specifications refers to compression members and reads as follows:—

[illegible]

This member consists of two halves, each half being built up of a plate and two angles, two additional plates being added for a portion of the length of the member. Each individual half is relatively weak as regards transverse stiffness, the end batten plates are short, and the battening consists of 2½ by 2½ by ⅜ in. angles at about 45 deg. inclination, with one ¾-in. rivet at each end. The battening was in most cases not bent, but the rivets were in many cases sheared off. An inspection of the rivets showed that they were sheared almost as neatly as if by a shearing machine.

The steel was apparently of excellent quality, this being evidenced by the bending which it withstood without fracture. All of the rivet holes in the jib were either sub-punched and reamed or drilled in the solid, and the question of workmanship evidently did not enter into the failure. The material was inspected in Germany and the mill tests on material later worked into member No. 29 gave the following results:

Section	Ultimate strength per sq. in.	Elongation in 8 in.	Elongation per cent.	Cold bending. Quench bending.
Plate	[illegible]	[illegible]	30	Good
Angle	... 55,000	[illegible]	29	Good
Flat	... 54,000	[illegible]	27	Good

The requirements for the structural steel were as follows:—

[illegible] ultimate tensile strength in the direction of rolling, between [illegible] lb. per sq. in. and 62,500 lb. per sq. in., with a minimum elongation of 20 per cent.

COLD AND QUENCH BENDING TEST.

[illegible] in the direction of rolling 180° around a diameter equal to the thickness of the test piece, without sign of fracture on the convex side of the bent portion.

Six specimens cut from the member No. 29 were tested at the Balboa shops of the Panama Canal with the results shown in the following table:

Samples Marked.	Elastic limit per sq. in. in lb.	Ultimate stress per sq. in. in lb.	Elongation per cent. in 8 in.
1. Angle	32,000	50,400	20·0
2. Angle	35,000	50,800	28·8
3. Flat	32,950	49,570	27·4
4. Flat	31,840	49,100	29·2
5. Web	35,020	54,000	31·4
6. Web	35,370	54,180	30·2

The fractures were in every case "fine silky." The material was also subjected to cold bending and quench bending tests, which showed that the material conformed to the contract requirements in this respect.

It will be noted that the ultimate tensile strengths developed by tests on the Isthmus were less than those shown by the tests in Germany. The reason for this disagreement has not yet been ascertained.

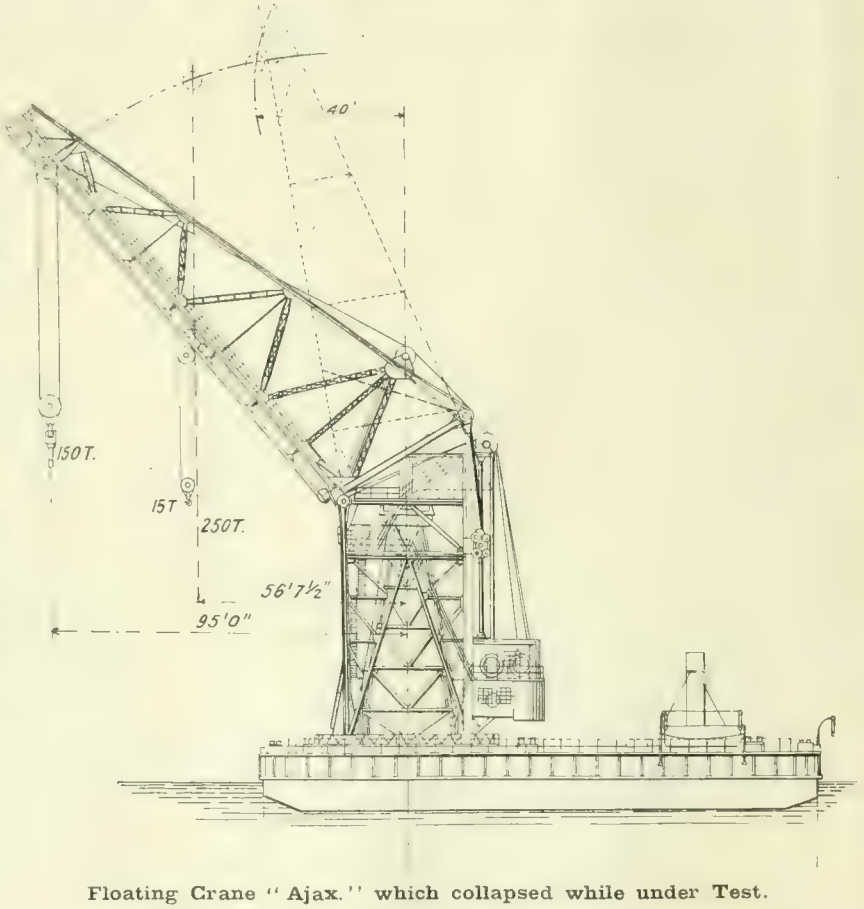
Table I, following, shows the computed stresses in member No. 29 in the "100-ton" position; first as estimated by the contractor for 100-ton suspended load, second as computed by the Panama Canal for 100-ton suspended load, and third as computed by the Panama Canal for 122·5-ton test suspended load. The reason for the differences between the first two estimates is that the contractor estimated on the basis of a pontoon inclination of 5 deg., while the estimate made by the Panama Canal is on the basis of the inclination existing at the time the crane was tested. Similarly, actual conditions have been used in estimating the stress at the time of failure, *i.e.*, actual inclination and reach, actual wind, and dead load of trolley at inboard end of jib. The results are expressed in metric tons of 2,204·5 lb.

TABLE I.

Stresses in Member No. 29 in Metric Tons of 2,204·5 lb. in the 100-ton Position.

	1. Condition A. As estimated by contractor with 100 metric tons suspended load, 12·8 m. radius, 5° inclination 10 lb. wind.	2. Condition A. As estimated by Panama Canal with 100 tons suspended load, and reach inclination, and wind obtaining at the time of test.	3. Condition B As estimated by Panama Canal with 122·5 tons suspended load and reach, inclination and wind as obtaining at the time of test.
Dead load	76·3	73·0	67·0
Live load	174·0	171·6	196·0
Wind	4·1	·9	·3
Total	254·4	244·6	263·3

From the study of the elements of member No. 29 considered as a whole, and setting forth the permissible and actual unit stresses



Floating Crane "Ajax." which collapsed while under Test.

theoretically existing, it was seen that the area at the middle of the member is about 30 per cent. in excess of that at the ends, and that the unit stresses at the middle are well within the specified limits, while at the ends the unit stresses in condition "A" exceed the permissible limits by about 1,800 lb. per sq. in. It is to be noted here that the original specifications gave two sets of permissible unit stresses, one set, known as condition "A," being for loads within the rated capacity with wind not exceeding 10 lb. per sq. ft., the other set, known as condition "B," being for the crane under conditions of test load with wind pressure assumed at 5 lb. per sq. ft., and for the unloaded crane with wind pressure at 40 lb. per sq. ft. Since the test loads were but 20 per cent. in excess of the capacity loads, while the permissible unit stresses were nearly 30 per cent. in excess of the working unit stresses, the contractor did not consider it necessary to make complete calculations for condition "B," confining these calculations to cases where wind pressure was the determining feature.

Each half of member No. 29 was further investigated as regards its strength, considered as a short column of length represented by the distance between ends of lattice bars, with the result that the maximum value of L/R is 58·7 for the end sections and 42·8 for the middle section; these values are in each case less than for the member considered as a whole, and therefore the member is theoretically safe.

It is conceivable that, due to the unstayed condition of the intersection of member No. 29 with member No. 28, a component of the dead weight could cause bending stresses at the foot of No. 29, due to the longitudinal inclination of the pontoon which existed at the time of failure. This inclination was, however, but slight, not exceeding about 2 per cent., and since the dead load at the point in question is but 8·2 tons the additional stress at the bottom of member No. 21 cannnot be large, especially when the action of the portal in member No. 28 and the bracing in the plane of member No. 23 are taken into account.

It appears, therefore, that the theoretical stress existing in member No. 29 at the time of failure implied a factor of safety of at least two, figured on the elastic limit of the material. No evidence was found pointing to local defects in material or workmanship. There was a crunching sound heard at the jib pins during the tests preceding the one in which failure occurred, but examination of these pins after the collapse showed that they were unscored and that the crunching probably arose from the movement of the jib on the spherical bearing surrounding the jib pin, which does not affect the force necessary to luff in the jib.

An excessive stress could have been caused if the main hoist drums had not been free to move, but immediately after the accident the magnetic brakes on the main drums were examined and found free.

Since member No. 29 failed just as the jib commenced to be luffed in, which luffing-in was necessary because the dead load of the trolley was not at the upper end of the jib, and the existing inclination would be exceeded with the trolley run out without luffing the jib in, it is very possible that vibrations were set up in member No. 29, which is one of the two members meeting at the point where the luffing-in pull is applied, with the result that the rivets connecting the two halves of member No. 29, already near their limit of resistance, were finally sheared, causing member No. 29 to consist of two weak halves, with the result that they bowed outward. This action once started would continue, member No. 28 would commence to bend, and the collapse of the entire inboard end of the jib is then inevitable.

The opinion that the collapse of the jib was due to intial failure of member No. 29 and that this initial failure was due to insufficient provision of latticing, battens, &c., is based on the foregoing facts, which may be summarised as follows:—

1. There is no indication of faulty material or workmanship at any point of the jib.

2. There are no indications that either during manufacture, erection, or use the crane suffered damage or was subjected to loads beyond its capacity.

3. The hoisting drums were free and no defect could be found in the luffing machinery by running the spindle carriage up and down after the wreck had been cleared away.

4. Rivets snapped and fell just prior to the collapse of the jib. An examination of the wrecked jib showed that the rivets connecting the two halves of member No. 29 were sheared, while the maximum unit stress in member No. 29 was well within the elastic limit. Similar shearing of rivets was not observed in other members.

The contractor did not share the opinion of the Panama Canal that the failure was due to insufficient lattice bars, batten plates, &c., and he expressed such confidence in his design that on December 10, 1914, he offered to subject the *Hercules* to exactly the same conditions as those under which the jib of the *Ajax* collapsed, but in view of the circumstances the Panama Canal was unwilling to permit this to be done without reinforcing certain members of the jib. This point of view was also taken by the underwriters.

The reinforcement of the jib of the *Hercules* was completed January 27, 1915; this reinforcement was executed in accordance with drawings made by the Panama Canal and was confined to members 27, 28 and 29. Member No. 27 was given additional tie plates; in member No. 28 the internal system of latticing was replaced by an internal diaphragm plate; in member No. 29 the latticing on one side was replaced by a continuous cover plate, on the other side the 2½-in. angle latticing was replaced by 6 by 3½-in. angle latticing with four rivets at each end instead of one, and additional diaphragms and batten plates were provided. The contractor ordered a complete new jib for the *Ajax* to be made in Germany, incorporating substantially the reinforcement above described for the *Hercules* plus minor additions to other members, to make the details conform more nearly to American practice.

After the completion of the reinforcement of the jib of the *Hercules*, the crane was in the service of the Panama Canal for about one month prior to acceptance tests. These acceptance tests were completed March 27, 1915, without mishap. The crane met the contract requirements fully as regards capacity, reach and speed of all motions.

The new jib for the *Ajax* was completed in Germany by about the middle of April last, and the greater part was shipped on May 8 from Rotterdam to New York, on the Holland-America liner *Cornelius*, for transhipment to Christobal, the Allies having undertaken to allow it to proceed without interference. The new jib is practically identical in construction with the first, excepting that several of the members have been reinforced.

GERMAN VESSELS IN ITALIAN PORTS.

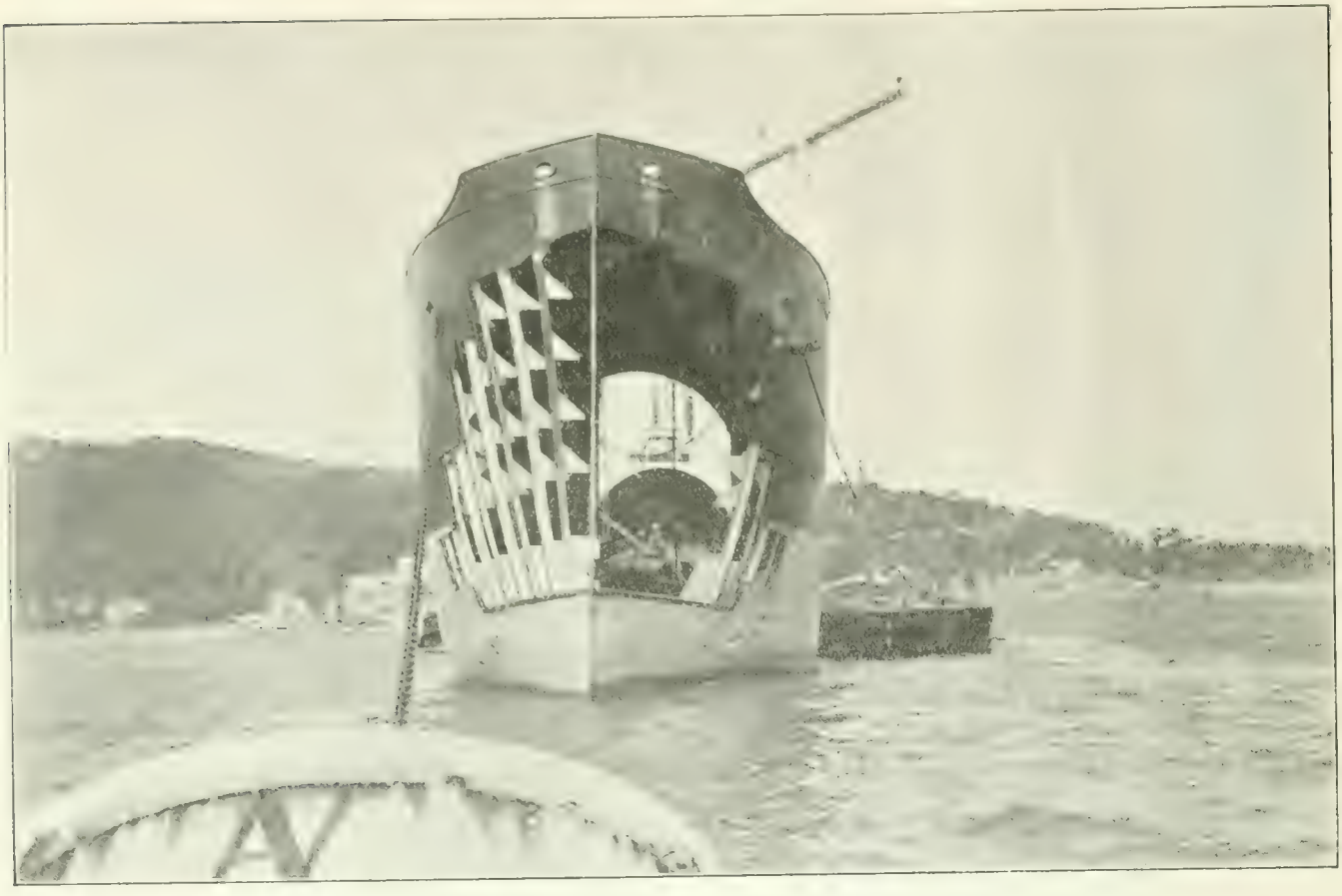
In announcing the confiscatory policy of the Italian Government where interned enemy vessels are concerned, *Schiffbau* admits the pertinent fact that, were this policy not enforced, the vessels could hardly hope to evade the French and British cruisers lying between Italy and Austrian ports. German faith is apparently pinned to the possibility of recovering the vessels plus indemnity after the war. Of the 57 enemy steamers (229,000 gross tons register) interned in Italy, the 36 enumerated below (153,857 gross tons register) are German-owned:—

	Ship.	Gross Tons Reg.	Port.		Ship.	Gross Tons Reg.	Port.
I.	*Albany* ...	5,882	Syracus.	IV.	*Spitzfels* ...	5,809	Cagliari.
II.	*Imbros* ...	2,380	Girgenti.		*Sturmfels* ...	5,660	Massaua.
	Italia ...	3,498	Torre Annunziata.	V.	*Borkum* ...	5,642	,,
					Choising ...	1,657	,,
	Lemnos ...	2,478	Ancona.		*König Albert*	10,484	Genua.
	Mudros ...	3,137	Syracus.		*Prinz Regent Luitpold*	6,595	,,
	Samos ...	1,922	Venedig.				
	Volos ...	1,903	,,		*Sigmaringen*	5,710	Syracus.
III.	*Ambria* ...	5,143	Syracus.	VI.	*Waltraute*...	3,818	Bari.
	Barcelona ...	5,465	,,	VII.	*Hermersberg*	2,824	Genua.
	Bayern ...	8,006	Neapel.	VIII.	*Algier* ..	3,127	Palermo.
	Christian X.	4,956	Massaua.		*Amalfi* ...	1,756	Livorno.
	Moltke ...	12,335	Genua.		*Bastia* ...	1,527	Palermo.
	Ostmark ...	4,400	Massaua.		*Catania* ...	2,996	Savona.
	Persepolis ...	4,566	,,		*Lipari* ...	1,539	Catania.
	Rhenania ...	6,455	Neapel.		*Marsala* ...	1,753	Neapel.
	Segovia ...	4,945	Massaua.		*Portofino* ...	1,754	Livorno.
	Arenfels ...	4,361	,,		*Termini* ...	1,523	,,
	Kattenturm	6,018	Syracus.		*Tunis* ...	1,833	Palermo.

With the exception of the freight and cargo steamers *Moltke*, *Rhenania*, *König Albert* and *Prinz Regent Luitpold* and the motor ship *Christian X.*, all the above are cargo steamers.

The Roman numerals denote owners as follows:—I, Deutsche Australisch Dampfschiff-Gesel. II, Deutsche Levant Line. III, Hamburg-America Line. IV, Hansa Dampfschiffarhtsgesell. V, Norddeutsch. Lloyd. VI, Oceana A.G. VII, Emil R. Retzlaff. VIII, Rob. M. Sloman, junr.

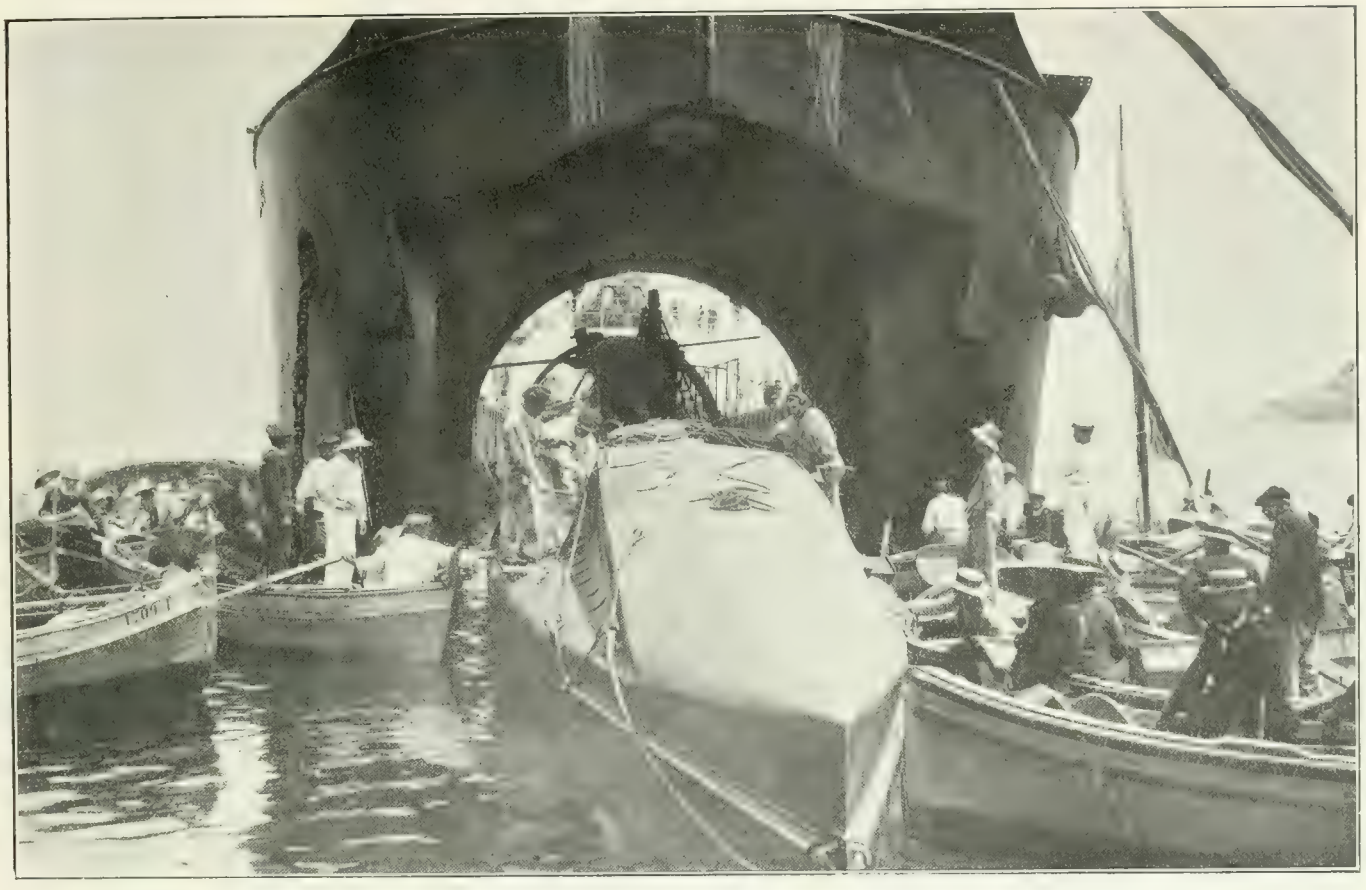
THE SUBMARINE TRANSPORTER "KANGUROO," WHICH HAS BEEN



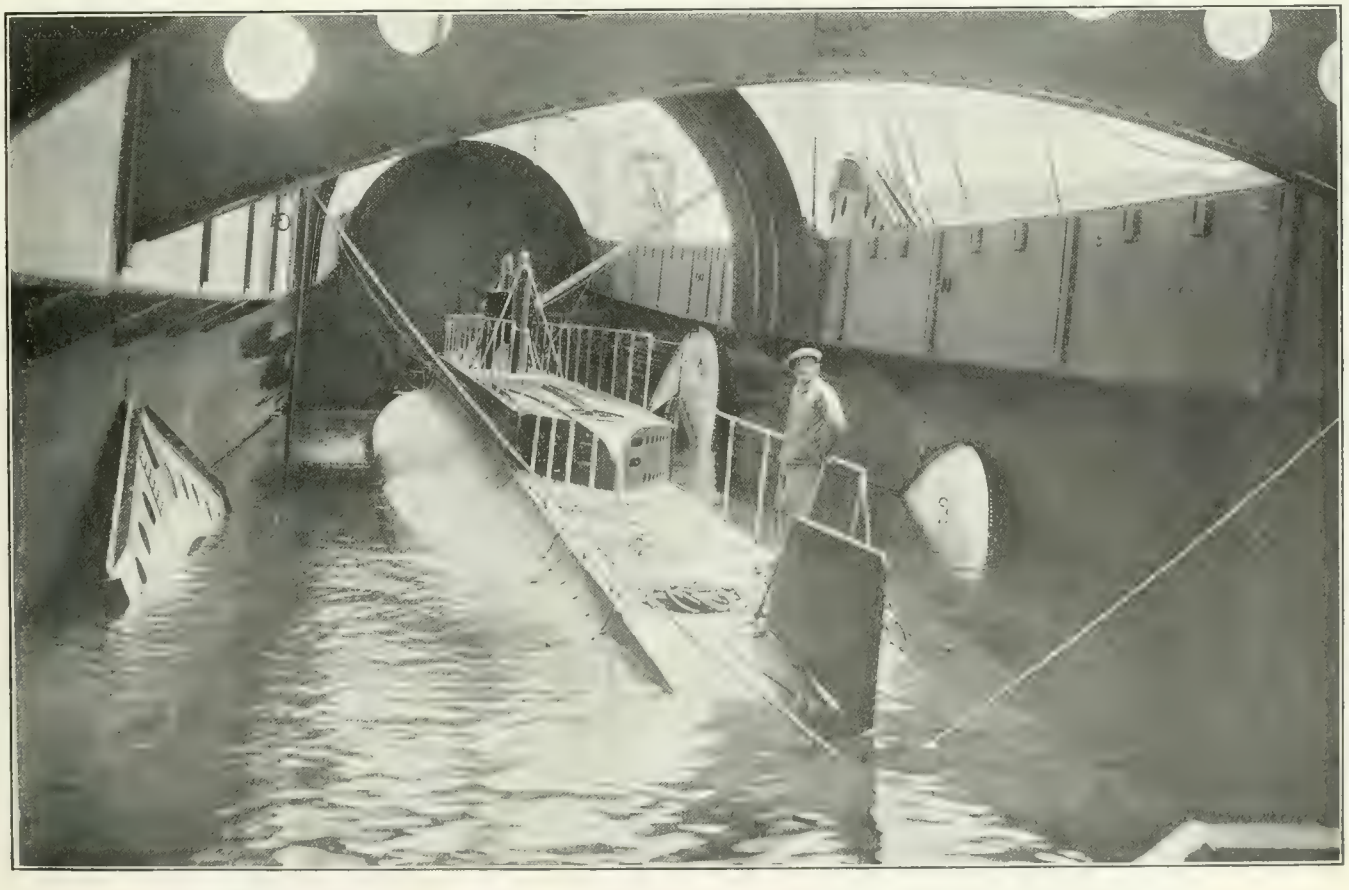
The "Kanguroo" with Bow Plates Removed and Framing on Port Bow Cleared.

Submarine Preparing to enter the "Kanguroo."

CHARTERED BY A NEW YORK FIRM FOR GENERAL CARGO. (See page 12.)



Another View of the Bow, and the Submarine entering the "Kanguroo."



Submarine Berthed and awaiting the Raising of the Vessel to Clear Water out of Hold.

ADAPTING A SUBMARINE TRANSPORTER FOR GENERAL CARGO.

The announcement that Messrs. Norton, Lilly & Co. have chartered the *Kanguroo* to load at New York for Bordeaux is an interesting sidelight on the demand for tonnage at present, since the *Kanguroo* was designed by Messrs. Schneider & Co., Le Creusot, for delivering submarines to foreign owners. The vessel, however, has the advantage that when not being used for this purpose it may be considered as a single-deck cargo boat, although it is obvious that the compromise effected in the design would hardly make the vessel a paying one, excepting in the existing high freight rates.

The *Kanguroo* has been employed as a submarine carrier on few occasions. The first two voyages were when Messrs. Schneider & Co. sent Laubeuf submarines to Callao for the Peruvian Government, and last year she was employed by the Fiat San Giorgio, of Spezia, to deliver a Laurenti submarine to Rio de Janeiro.

The principal dimensions are :—

Length, extreme	365 ft.
Breadth	39 ,,
Draught, mean	19 ,,
Displacement	5,540 tons
Carrying capacity	3,850 ,,
Tonnage	2,493 gross, 1,720 net.

The vessel is built entirely of steel and is propelled by triple-expansion engines of 850 h.p., giving a speed of about 10 knots. The ship is divided into three main parts, namely : (i) the after portion, containing the propelling and auxiliary machinery, accommodation for crew and so on ; (ii) a large hold, 190 ft. long, and capable of accommodating a submarine ; and (iii) the fore part of the ship specially designed for allowing the submarine to pass into the hold and containing the main tanks for raising and lowering the vessel.

This large hold consists of a double shell, with a hatchway covered by hatches removable by means of a traveller-bridge. The space between the two skins is constructed for water-ballast in the lower part and has air-chambers in the upper portion.

In the bow of the ship there is a tunnel, the lateral walls of which are watertight. The space between these walls and the shell consists of three water-ballast tanks, one at the bottom and two higher up the sides. At the extremity of the tunnel, which is separated from the hold, strictly so-called, is a watertight double swing door. The portion immediately in front of the entrance of the tunnel consists of sections which can be removed in order to admit the submarine.

The *Kanguroo* with bunker coal, has her trim so altered by the filling of the water-ballast tanks aft, that the stem rises completely out of the water. The bow plates which cover the tunnel referred to are removed, and the double swing doors at the extremity are opened, thus giving free access to the hold. The water tanks in the fore part of the ship are next filled. This has the effect of making her sink at the bows until the bottom of the hold is lower than the draught of the submarine. When this is completed and the vessel is trimmed satisfactorily the submarine enters the hold through the tunnel. Wooden chocks and stays are placed in the hold for the submarine to rest on, and when all is completed the trim of the *Kanguroo* is again altered by emptying the ballast-tanks in the fore part of the ship, whilst still maintaining communication between the hold and the sea. As soon as the stem of the ship is sufficiently out of the water the swing door is closed, the bow plates are replaced, leaving the submarine high and dry, resting on the chocks referred to. The trim of the vessel is then adjusted for proceeding to sea. These operations are illustrated on pages 10 and 11, but it will be seen that for certain types of cargo the large free hold is particularly advantageous. Moreover, there are cases, such as in the timber trade, where the facilities afforded by the open bow may be taken advantage of.

THE EAST INDIA DOCKS EXTENSIONS.

The Port of London Authority are now completing a great improvement scheme at the East India Docks. Situated only 3 miles from the City, these docks have hitherto been ill-adapted to the needs of cargo steamers. Works have now been carried out which render them immediately available for vessels of large dimensions and of deep draught, while at the same time, by the erection of a series of large sheds, the storage and transport abilities of the Port of London, which have been so severely taxed since the war broke out, will receive the substantial and valuable addition of eight berths for ocean-going ships. Unless unforeseen demands are made upon the port it will now be possible to avoid the tendency to congestion which has, since August last, occurred in the other docks.

One of the principal objects of the scheme, which has taken about three years to complete, has been the modernising of the import dock, an enclosed water area of some 17 acres which was opened in 1806 for East Indiamen. Admission to this was formerly restricted by the fact that the lock from the East India Dock basin was shallow, narrow and of old-fashioned shape. It was decided to demolish this lock, and to substitute for it one 80 ft. wide, and having 31 ft. of water on the sill. These increased dimensions will allow vessels up to 8,000 tons (such, for example, as steamers engaged regularly in importing North American produce into London) to enter the docks.

The new lock is 300 ft. long, as compared with 209 ft. in the case of its predecessor. But as a uniform depth of water can be secured in basin, lock and import dock, vessels up to 500 ft. in length will be able to pass through

The swing bridge over the lock is of a novel character, so far as the docks of London are concerned. The bridge is of what is known as the "end lift" type. Instead of being pivoted upon a revolving centre, and raised or lowered by means of hydraulic ram, one end of the bridge is lowered for swinging as the other is raised. From the point of view of wear and tear, as well as of ease in repairing, the abolition of the central ram is considered advantageous. In general it is claimed for this new type of swing bridge that it permits of a much more economical use of hydraulic power.

The quays of the import dock have been largely transformed. Its north and east quays have been widened by 20 ft. in reinforced concrete, offering an available berthage of 1,850 ft., with travelling cranes and other necessary equipment, and an available depth of water alongside of 28 ft. On the north quay have been erected three single-storey transit sheds of steel and galvanised iron each covering an area of about an acre. The dimensions of each are 410 by 110 ft. On the east quay there has been built a double-storey shed of ferro-concrete, which is 420 by 50 ft. The accommodation on the south quay was greatly improved a few years ago.

By the erection of powerful electric pumping plant provision has been made for impounding the water in this system of docks to the extent of an additional 2 ft., so that the total depth throughout will be 28 ft. This will be a considerable advantage both to the export dock and to the import dock. The pumping plant is designed to deal with 84,000 gall. of water per min.

American Shipping Inspectors.—Commenting on the proposal of the American authorities to commission inspectors to travel incognito on vessels and examine during the voyage the safety devices and boat drills, &c., the *Hamburger Fremdeblatt* says that although such inspection during voyages would doubtless be of some value, no Government has the right to maintain a regular inspection service outside its dominions ; to do so would infringe the sovereign rights of the State under whose flag the vessel sailed. On the other hand the captain could, it is maintained, refuse to allow any passenger (including the incognito inspector) to interfere in any way whatever with the equipment or management of the vessel. It is contended also, that the new American proposal is in direct opposition to the principle of mutual recognition and acceptance of State inspection laid down by the *Titanic* Conference.

GENERAL NEWS SECTION.

PERSONAL.

The late Mr. William Wood, of Newcastle-on-Tyne, shipbuilder, left £37,517.

The death has occurred at North Shields of Mr. Samuel Young, for 17 years Assistant Manager of the Bull Ring Department of Messrs. Smith's Dock Company, Ltd., North Shields.

His Excellency the Governor of Madras has received a communication from Lord Inchcape announcing the intention of the British India Steam Navigation Company to subscribe Rs. 10,000 monthly to the Madras War Fund.

The directors of Robert Stephenson & Co. announce that Mr. H. Pike Pease, M.P., having accepted the position of Assistant Postmaster-General in the present Government, has felt himself obliged to resign his position as a director.

The Board of Trade have awarded a piece of plate to Don Avelino Quevedo, master of the steamship *Olazarri*, of Bilbao, in recognition of his services in rescuing the shipwrecked crew of the steamship *Tullochmoor*, of London, which was sunk in the English Channel on May 28, 1915.

Mr. Henry James Taylor, who for many years superintended the building and fitting out of the hulls of the vessels building for the P. & O. at Messrs. Caird & Co.'s yard, and who died last May, left personal estate in the United Kingdom valued at £2,883, of which £856 is Scottish estate.

The Board of Trade have awarded a piece of plate to Mr. Carl Georg Hanson, master of the Swedish steamship *Heimdal*, of Gothenburg, in recognition of his services in rescuing the shipwrecked crew of the steamship *Hartdale*, of West Hartlepool, which was sunk off the South Rock Lightship, Irish Sea, on March 13 last.

Mr. Philip Edward Haldinstein has been accorded permission by His Majesty to assume the surname of Haldin. Mr. Haldin is a popular member of the Baltic and is Chairman of Messrs. Haldinstein & Co., Ltd., managing owners for the Court Line of steamers. We understand that the name of the firm will be known in future as Haldin & Co. Mr. Haldin's family have long associations with Norwich dating back at least a century.

Mr. John Holt, the well-known West African merchant and shipowner, and head of the firm of Messrs. John Holt & Co., Ltd., Liverpool, has died at the age of 74 after a long illness. Mr. Holt was the first to adopt in his steamers, which trade to, and on, the coast of West Africa, preventive measures against the mosquito as recommended by Sir Ronald Ross, the then head of the Liverpool School of Tropical Medicine. Mr. Holt, in association with the late Sir Alfred Jones, Mr. Ellis Edwards and others, took a prominent part in the development of trade with the West African Coast.

Captain J. R. Jones, who was in charge of a troopship on April 22 last, was on Thursday last, at Avonmouth, presented with a gold watch and an address on vellum by Captain Lucas, Chief Transport Officer, on behalf of the Admiralty. The watch was inscribed as follows: "Presented by the Lords Commissioners of the Admiralty to John Rees Jones, master of the ss.———, in recognition of the example set by that vessel when attacked by a German submarine, 22nd April, 1915." Captain Jones, who formerly commanded the Cardiff-owned steamer *Cymrian*, was only recently the recipient of a handsome cup from the Norwegian Government for rescuing the crew of the steamer *Rogaland* in the Bay of Biscay in December last.

Commander W. S. Atkin, R.N., commodore of the fleet of vessels owned at Goole by the Lancashire & Yorkshire Railway (Goole Steam Shipping) Company, Ltd., has been appointed to some important shore duties in London by the Admiralty. Commander Atkin is a member of the Humber Conservancy Board, and he was born at Brisbane, Queensland, in 1869, and commenced sea life as a cadet on the Mersey training ship H.M.S. *Conway* when aged 12 years. After several years on sailing ships, he served in the Royal Navy, and commanded the storeship H.M.S. *Humber*. Subsequently he served on the White Star Line at Liverpool, and in 1899 was handed the Transport Service Medal for taking the *Cymric* to South Africa. He has been appointed to the *President*, the Thames drill ship, and will soon take up his duties in London.

FROM OUR CORRESPONDENTS.

CLYDE AND DISTRICT.

(From Our Own Correspondent.)

Glasgow.

Two more new steamers were completed at Glasgow last week, and both have since been put into commission. One is a large cargo steamer built by Messrs. Charles Connell & Co. and engined by Messrs. Dunsmuir & Jackson for Messrs. T. & J. Harrison, of Liverpool, and the other is a fruit-carrying twin-screw steamer, named the *Camito*, built for Messrs. Elders & Fyffes by Messrs. A. Stephen & Sons, Linthouse. The departure of these two leaves only four new vessels now fitting out in Glasgow Harbour, although, on the lower reaches of the river there is a larger number in the course of construction. Two at least are of more than ordinary interest. There is, first of all, the *Cumberland*, which has been built by Messrs. William Hamilton & Co. for the Federal Steam Navigation Company. She is a vessel of 474 ft. in length, and she is designed with a cruiser stern. Her propelling machinery, now being installed at Glasgow by Messrs. David Rowan & Co., consisting of four steam turbines geared to two screw shafts. The other vessel referred to is the motor ship *Bostonian*, of 5,200 tons, built by Messrs. Harland & Wolff for the Leyland Line. The oil engines are being supplied by the Burmeister & Wain Company, Glasgow. Messrs. Barclay, Curle & Co. have also in the harbour a new steamer—the *Mandala*—being fitted out for the British India Company. The only other new vessel is the steamer *Wexford Coast* (425 tons), built by Messrs. Fullerton, of Paisley, and engined by Messrs. Ross & Duncan, Glasgow, for the Powell, Bacon & Hough Lines, Ltd., Liverpool.

Shipbuilding Contracts.

The announcement of a new shipbuilding contract having been placed is now an event of somewhat rare occurrence on the Clyde. This does not necessarily mean that no orders are coming to the river, but shipbuilders are saying less about their work than in the pre-war days. Although it was announced last week only that Messrs. A. Stephen & Sons had booked an order for a steamer for the Shaw, Savill & Albion Company, the contract was really placed some considerable time ago. This vessel, which is intended for the Australian trade of the company, is to be a high-class steamer of about 11,500 tons gross. Of the Shaw, Savill & Albion Company's existing fleet only one vessel is Clyde-built—the *Waiwera*, which was constructed by Messrs. William Denny & Bros., Dumbarton.

Scottish Steel Trade Busy.

The Scottish steel trade continues very busy and the output of finished material is abnormally high. The demand for ship plates for mercantile work is somewhat restricted, but a good deal of shipbuilding material for Admiralty work is being turned out. Ship plates for local delivery are now quoted at from £9 15s. to £10 per ton and boiler plates from £10 5s. to £10 10s. per ton. The import of steel at Scottish ports is still pretty heavy, most of the supplies coming from the United States and Canada. During May the total amount landed from Transatlantic ports was 9,866 tons, valued at £69,823. From the Continent there came only 11 tons, valued at £119. The bulk of the imports from the

United States and Canada consisted of iron and steel hoops and strips and wrought steel bars, angles &c. There were also a fair amount of steel plates brought in from America.

Greenock Harbour Facilities.

It is probable that an improvement will shortly be made in the railway facilities at the port of Greenock. Since the reconstruction of the Harbour Trust two or three years ago there has been a remarkable development in the trade of the port, and the Trustees are now of opinion that the existing railway facilities will prove inadequate to meet a further expansion of trade. As a preliminary step to the introduction of certain improvements a conference was held at Greenock last week between the general and goods traffic managers of the Caledonian Railway Company and the Glasgow & South Western Railway Company and representatives of the Greenock Harbour Trustees. It is understood that the managers of the railway companies indicated the nature of the facilities which they intend to provide for the handling of traffic to and from the harbours.

MERSEY SHIPPING AND SHIPBUILDING.

(From Our Own Correspondent.)

Liverpool.

Messrs. H. E. Moss & Co.'s semi-annual Steamship Circular, which is published next Thursday, is of more than usual interest just now when new and second-hand tonnage is fetching such high prices in the open market. After some preliminary observations, the shipbrokers say: "With such profitable freights as have been current since last autumn, enabling many steamship owners to secure employment, and if all goes well, practically to expect to pay off in one or two years the first cost of their steamers, prices for both new and second-hand vessels have risen weekly, in fact, up to quite recently, daily. New steamers that realised £6 per ton deadweight 12 months ago have been sold for nearly double that sum, and second-hand prompt steamers have readily found purchasers at more than twice the cost paid for them last year.

"Many owners have taken advantage of present circumstances and have realised handsome profits; in fact, some steamers, 10 to 15 years old, have been sold for much more than they originally cost, and far above their book values.

"As to the future, we are still hopeful. Although history may repeat itself, and there may be a temporary reaction in freights and consequently of values until the finances of the world right themselves, we will eventually see such times as shipowners may well be proud of, but for many years we may not expect to be able either to build new steamers or buy ready ones at anything like what has been current during the last decade."

American Freight Rates.

Commencing on Thursday this week, the North Atlantic steamship lines trading between Liverpool and the United States, and also Canadian ports, will further advance their freight rates by 2s. 6d. per ton, to cover the present increased cost of operating and other outgoings incidental thereto.

A report of the Liverpool Underwriters' Association dealing with May casualties, estimates the value of steamers losses at £3,084,000, against £746,500 in May last year, and £413,000 in May, 1913. The losses directly attributed to the war in the May return this year is calculated at £2,333,500 out of the total before mentioned.

There has been a marked decrease in the number of steamers waiting to discharge at Liverpool. From 38 a week ago, the waiting list has been brought to under 30. At the beginning of June the number was over 60.

SOUTH WALES NOTES.

(From Our Own Correspondent.)

Cardiff.

At a meeting of the Swansea Chamber of Commerce on Friday last it was reported that with respect to a proposal of the railway companies to increase the tipping charges, consequent on increased wages to the men, that the Council had received a reply, but it was of such a character that it was undesirable to discuss it until the Council had considered it and were in a position to submit a report. It was suggested that meanwhile members should refuse payment. Attention was also drawn to the difficulty in getting despatch of coal from the Gwendraeth Valley for shipment at Swansea and that boats had been very much delayed. It was decided to approach the Great Western Railway Company and ask them if some better understanding could not be arranged with the Gwendraeth Railway. The Swansea Labour Employers' Association have granted the docks' hatchwaymen an advance of ½d per hour. Broken time, caused by weather and other conditions, to be paid for.

Ship Repairing.

No change of importance can be recorded in the general position of Welsh ship repairing. Plating work continues plentiful, and while some firms are engaged at their maximum pressure, others are only moderately employed. Scarcity of labour, especially platers, continues to cause employers much anxiety. At Cardiff the Bute Shipbuilding & Engineering Company are straightening and "s affing" the stem and renewing a few bow plates on the steamer *H. J. Radcliffe*, besides refitting a number of new furnaces. The Cardiff Channel Dry Docks & Pontoon Company, Ltd., are giving the steamer *Knightsgarth* a big overhaul, while Messrs. T. Diamond & Co. are fitting about 35 deck plates on the steamer *Canford Chine*, which they are putting through her survey. The Greek steamer *Theofano Siderides*, which was in collision recently, is having her stem bar and about 28 bow plates renewed by the Mercantile Pontoon Company, Ltd., and also a dozen frames and eight stringers cut away and renewed. Messrs. John Shearman & Co., Ltd., are repairing 28 vessels at Cardiff, Barry and Newport, including the steamer *Clutha River*, which has heavy bottom damage, something like 60 plates and floors and also about 30 tank top plates requiring to be replaced, while the Mountstuart Dry Docks, Ltd., are renewing the stem bar and about 10 bow plates on the steamer *Northwaite* and the stem bar and about 25 bow plates on the steamer *Enidwen*, besides very extensive bottom damage on the steamer *Kingsway* and general repairs to other steamers. The Barry Graving Docks & Engineering Company, Ltd., are carrying out heavy bottom repairs to the steamer *Towneley*. At Swansea, Messrs. Harris Brothers, Ltd., proprietors of the Cambrian Dry Docks, are particularly busy with a number of oxy-acetylene jobs, in which they specialise. The steamer *Stamfordham*, for instance, is having heavy bottom damage repaired besides machinery repairs and a welding job on the boiler. A grain elevator barge is also having bottom damage attended to, while the steamer *Iris* has had her boilers re-tubed, besides welding work. The Prince of Wales Dry Dock Company are repairing two large holes on each bilge of the steamer *Turnwall*.

UNITED STATES—SHIPPING AND SHIPBUILDING.

(From Our Own Correspondent.)

New York.

The first mercantile vessel to be built in America with a cruiser stern has just been ordered from the Fore River Shipbuilding Corporation, Quincy, Mass., by the Luckenbach Steamship Company of New York. This boat is to be a large cargo carrier of the shelter deck type, specially designed for the coast-to-coast trade via Panama Canal and will be 437 feet in length by 57 ft. beam. Classification is to Lloyd's Register for highest class and the general particulars will conform to those of another boat for the same owners now building at Newport News.

American Ships and Classification Societies.

The fact that most of the vessels at present on order in America for the domestic trade are being built to Lloyd's classification and survey has excited unfavourable comment in certain ultra-American circles who see something unpatriotic in the policy followed by American owners in not patronising more extensively the only American classification society in existence. At various times attempts have been made to bolster up the falling fortunes of that society by legislation compelling all American ships to undergo survey at its hands, but the Bills designed for that purpose never succeeded in getting beyond the Committee stage in Congress. This American classification society was at one time specially favoured by American underwriters, but of late its rules have been found too onerous to owners to warrant building to them. It may happen that in days to come the great British institution will find it to its advantage to set up an autonomous organisation in America. But whatever is the outcome, it can be considered as pretty certain that the American society referred to above will not regain its former prestige. It should not be overlooked when discussing this matter that the departments of the United States Government themselves have on many occasions signified their approval of the rules and efficiency of Lloyd's Register by specifying in contracts for ships that scantlings were to come up to Lloyd's standard.

THE FREIGHT MARKETS.

(From Our Own Correspondents.)

London.

There is little animation in the various sections of the freight market, although some slight improvement in the movement of maize from the Plate has to be recorded. The Gulf market is slow, and the same may be said in regard to Montreal and the Eastern section. Time chartering shows little movement. The steamer *Lincolnshire* has been taken for one trip at 14s. for a United States-Eastern round. There is also some inquiry for vessels to do White Sea and French rounds. Homeward with sugar from Java, the steamer *Kalibia*, a 7,200-tonner, has been fixed at 72s. 6d. to Marseilles, Havre, or St. Nazaire, option discharging in the United Kingdom at 75s. She gives mid-August cancelling. A few fixtures have been put through for White Sea business, and 115s. has been paid from Archangel to Hull. Soderhamn to Hull has been done at 75s. From Montreal, for heavy grain, to Genoa, the steamer *Benpark*, 27,000 quarters, 10 per cent., has been conceded 10s. 6d., July loading. From the Northern Range, also with heavy grain to Genoa, 9s. 9d. is paid to the *Daleham*, a 35,000-quarter, 10 per cent. boat. The Plate section may witness some slight improvement in rate in the course of a day or two, the general view being that for handy tonnage from up-river ports round about 47s. 6d. should be secured for the United Kingdom, 2s. 6d. extra French options, and probably 5s. extra for Mediterranean ports. From Santa Fé an opening is reported for a steamer at 45s. to load quebracho for New York. In the American coal section 38s. is offered to West Italy for three trips, the quotation to the Plate being round about 35s. From Bombay one of the "Tre" steamers has secured 52s. 6d. on deadweight to Hull or London. A 5,500-tonner, to load at Karachi, has been taken up at 47s. 6d. one, 48s. 6d. two ports United Kingdom, Dieppe or Havre, July 10-25. Outward from the Tyne coal freights are on the whole steady, though slightly lower than the level of a week ago. Genoa can be done at 27s. 6d., whilst Porto Ferraio has been closed at 28s. 6d. In the Bay trade 20s. is being paid to Bordeaux, and 19s. to Rochefort. A fair amount of medium-sized tonnage has been chartered for French Channel ports on the basis of Fécamp, 15s.; Rouen, 16s.; Caen, 14s. 6d.; and St. Malo, 14s. 6d. The London rate is nominal at 7s. 6d. Representative Cardiff fixtures include:—St. Vincent, 20s.; Calais, 13s.; Pernambuco, 24s.; and Marseilles, 25 fr. Garston to Greece has been done at 30s., and Swansea to Charente at 15½ fr.

Glasgow.

Business on the Glasgow market has been quiet for most part since our last report. Some chartering in the coal trade was carried through to French and Spanish ports, some of the fixtures being as follows:—Glasgow to Bayonne, 2,400 tons, 16 fr.; Glasgow to Bordeaux, 3,300 tons, 15·25 fr.; Glasgow to Dieppe, 800 tons, 17s.; Glasgow to Nantes, 1,800 tons, 16·25 fr.; Ayr to Rouen, 1,350 tons, 15s. 9d.; Glasgow to La Rochelle or Chantenay, 2,800 tons, 14·75 fr. Very little has been done for South American ports owing to Government restrictions regarding licences. A Glasgow steamer was reported fixed from Rosario to New York at 28s., July. America was very quiet so far as grain cargoes were concerned, and there was a fall in grain freights from the River Plate, the rate at the close being about 45s. from up-river ports to the United Kingdom, with 2s. 6d. extra for France. In the East, Karachi secured tonnage at 45s. to the United Kingdom and Java to France was done at 72s. 6d., with the United Kingdom option at 2s. 6d. Time charters have been scarce, but 15s. 6d. and 16s. was paid for trans-Atlantic trips, while 13s. 9d. was accepted for 12 months' trading.

Newcastle-on-Tyne.

There has been but little doing on the Tyne freight market during the past week and the list of fixtures is a short one. There is still not a great deal of tonnage offering but there is practically no competition, and, though shipowners are holding out for recent rates, prices are generally slightly weaker. As a result of the continued application of the Coal Export Restriction Order to coal cargoes bound for neutral countries, the demand for steamers is very small. Coasting and North French ports has been most favoured. It is now reported that the great congestion which has recently been in evidence at Rouen and other ports in North France and the Bay has been eased and that boats can now obtain berths within reasonable time. Coasting is rather easier and has been done at from 7s. 4½d. to 7s. 6d. to London. North France is markedly lower for most ports, but Havre at 15s. shows an advance of 6d. on the week. Of the other ports Calais is 1s. 6d. reduced, Dieppe 1s. and Dunkirk 2s. The Bay has Bayonne done at 20s., a decrease of 1s. The Canary Islands are weaker, with Las Palmas fixed at 22s. Mediterranean-wards, Genoa or Savona at 27s. 6d. and Leghorn at 28s. show Italian ports to be from 6d. to 2s. 6d. down. In other directions, rates are steady. Fixtures arranged since the last report include the following:—Algiers, 2,500, 20s.; Aden, 4,500, 36s. 6d.; Bayonne, 1,300, 20s.; Bordeaux, 3,000, 20s.; Boulogne, 1,300, 15s.; Calais, 570, 14s. 6d.; Caen, 1,000, 14s. 6d.; Dieppe, 1,300, 15s.; Dunkirk, 550, 14s. 6d.; Genoa, 4,000, 30s; 5,200, 27s. 6d.; 3,000, 27s. 6d.; Havre, 1,300, 15s.; Las Palmas, 2,200, 23s.; 2,600, 22s.; London, 1,700, 7s. 6d.; 450, 7s. 6d.; 1,450, 7s. 4½d.; Leghorn, 2,700, 28s., July; Marseilles, 1,700, 28s.; 2,700, 28s.; Naples, 5,100, 30s.; Oporto, 2,500, 22s. 6d.; 1,000, 22s. 6d.; Piræus, 3,300, 31s.; 9,500, 31s. 6d.; Rouen, 1,400, 16s. 6d.; 1800, 16s.; 1,400, 16s 4½d.; 1,000, 16s.; 2,100, 16s.; Savona, 5,200, 27s. 6d.; 3,000, 27s. 6d.

Liverpool.

A quiet tone still pervades this market, but rates generally keep steady, with every promise of adhering to their present level over the quiet season. Outward coal tonnage is in better request, since shipments can now be made to Spain. A fixture from Partington (Ship Canal) to Corunna made 16s., while Birkenhead to Gibraltar got a like sum, and 15 fr. was paid Liverpool to Bordeaux. Liverpool also fixed the *Orlock Head* to Archangel at 35s. On this market outward coal tonnage is further quoted at 30s. to River Plate, 22s. 6d. to Genoa, 25s. to Alexandria and 19s. to Las Palmas. Time-charter rates keep very steady for better class boats, which are scarce. Others have been taken up at from 13s. 9d. to 15s. 6d. in the trans-Atlantic trade; 17s. 3d. d.w. in the White Sea trade; 17s. d.w. Eastern trip home; and 15s. for an Eastern round trip. Homeward freights are generally steady, though most markets are dull. North America has little moving except coal, which is being shipped to Mediterranean ports, Virginia to West Italy making 40s., July-August, and 37s. to Barcelona. Oats from Montreal to Genoa paid 10s. 6d., July, and to United Kingdom or French Atlantic, 6s. 9d. to 7s. River Plate homewards has not much inquiry, but rates keep steady and may possibly improve. A boat fixed San Lorenzo to United Kingdom has made 46s. 3d. for July. Eastern markets are without change at recent reductions, Java basis now being 72s. 6d. to French ports and 75s. to United Kingdom for August and September. India also quiet at 45s. from Karachi and 55s. to 57s. 6d. on d.w. from Bombay. Mediterranean quiet but steady, with a firmer tone at the ore ports. Huelva has fixed two boats to the Mersey, one at 12s. 9d. to Garston and the other a prompt at 13s. North Pacific easier at 82s. 6d. to United Kingdom, though 85s. is reported having been done. Nitrate ports report little doing to United Kingdom except sail tonnage, which got 62s. 6d. to West Britain. Sail tonnage, both outward and homeward, is for the moment in poor request.

Cardiff and Swansea.

Though there has not been any material improvement in the demand, diminished offers of tonnage has for the time being arrested the downward trend of the market and rates at the time of writing (Monday) ruled firm for the Bay, Coast and River Plate directions and steady for handy sizes for the Mediterranean, but easy for large boats. Chartering operations were moderately active, tonnage aggregating 152,230 tons being fixed to load at Cardiff or Newport, or 33,780 tons more than in the previous week. Mediterranean fixtures include Alexandria, 25s. (500 tons delivery); Barcelona, 21s. (twice) and 20s.; Genoa, 22s. and 22s. 6d. (twice); Gibraltar, 16s. 6d.; Leghorn, 20s. and 23s.; Lisbon, 15s. 6d. (three) and 15s. (twice); Malaga, 19s.; Malta, 20s.; Marseilles, 24½, 25 (three) and 24 fr.; Naples or Salerno, 20s. (twice), 800 tons delivery; Naples or Leghorn, 21s., 500 tons delivery; Oporto, 16s. (twice); and Port Said, 22s. 6d. Bay and Coast rates displayed an advancing tendency on scanty tonnage offers, Bordeaux fixing at 18½ fr.; Caen, 12s. and 12s. 3d.; Havre Canal, 12s.; Havre, 10s. 6d.; Nantes, 15½ fr. (twice); Rouen, 13s. (four); St. Nazaire, 15½ (twice) and 14½ fr.; St. Servan, 10s. 9d.; and St. Malo, 11s. 6d. Several urgent inquiries for the River Plate resulted in a sharp upward appreciation in rates, owners refusing to fix, in view of the poor homeward prospects, with the result that merchants were forced to concede 30s., 27s. 6d. and 26s. 6d. for the River Plate; 24s., Pernambuco; and 25s., Rio de Janeiro. Canary Islands

business was confined to a couple of fixtures at 19s.; St. Vincent at 20s. Chartering from Swansea was quiet, 54,200 tons being fixed, or 2,170 tons less than in the previous week, while rates ruled steady, on the basis of Alexandria, 25s. 3d. and 25s. 6d. (500 tons delivery); Catania, 22s. 6d.; Marans, 19¼ fr.; Oran, 22 fr.; Cette, 11s. 9d. (three) and 12s. 3d.; Havre, 11s. 6d. and 11s. 9d.; and Rouen, 13s. (three) and 13s. 6d. (twice).

Hull.

The tone of the River Plate market is flat and there is practically no movement in this direction. The Mediterranean market also appears to hold little prospect of any substantial business, and rates are somewhat indefinitely quoted at round about 25s. for the West Italian ports; and 21s. for Alexandria from Hull. In the coasting branch a considerable activity has been displayed for tonnage for the North French ports, and a number of handy steamers have of late been chartered to Rouen at 16s., and this rate is maintained up to the time of writing. Other chartering done this week includes 13s. 6d. paid for Dieppe from Grimsby, 18s. 6d. for Rouen from Partington, and 7s. 6d. to 8s. for London from Hull according to size. From Russia a fixture of 1,200 tons was done at 23s. 6d. for Archangel from Hull.

COMPANY MEETINGS.

John Brown & Co., Ltd. Presiding at the annual meeting held at Sheffield on Tuesday, Lord Aberconway said that the so-called war profits of which so much was read in the papers formed only a small percentage of the profits in the balance-sheet then before the shareholders. Practically all the profits accruing up to March 31 was on ordinary mercantile and Government contracts placed before the war began, and of the orders placed before March 31 few had yet reached the profit stage. The ensuing year, which was also the jubilee year of the company, would show the results of the vast contracts entered into with the Government. The company had taken advantage of low prices ruling before the war with the result that the year under review had shown the largest profit in the history of the company. They now had a thoroughly efficient equipment, and if munitions were short in this country it was not the fault of John Brown & Co. They were never encouraged by the Government to do more than they had done, and sometimes they were in advance of the Government's demands. Out of the 55,000 men John Brown & Co. and its dependant companies employed, about 10,000 had joined the Colours. Those left behind had risen to the occasion and had formed relief committees for assisting the wives and families of men going out, and on behalf of the shareholders the directors had generously assisted those efforts, and were now paying something like £20,000 a year towards the dependants of those who had gone away. Since their origin the balance-sheets of John Brown & Co., showed that for the last 50 years the dividend had averaged just about 8 per cent. Nobody to-day would put their money into such a precarious business as an armament firm if they knew that 8 per cent. was all they were likely to get out of it. He did not suppose he was taking too gloomy a view of the future when he suggested that when the war was over it might be years before any of the armament firms got an order for battleships, guns, armour plates, or many of the things which they now produced in such large numbers. They might find that after a short period in which they would make a little money they might practically be without profits at all. If they looked at the development of all naval and military appliances during the last 50 years they would find that a very large proportion had been due to the skill and enterprise and the inventive capacity of private firms. They might take it that from rifle ordnance to aeroplanes almost everything in the way of novelty had been provided by firms like John Brown & Co. Developments and improvements in high-class steel, in armour-plates, and in marine engineering in all its branches he thought it would be found were nearly all based on metallurgical discoveries, and the patient investigation and experiment by which the country benefited had been carried on at the expense of such firms and their shareholders. In John Brown & Co. alone 8,000 had risked their money in paying salaries to highly skilled and scientific men who had developed the resources of the country in the service of the State. Such shareholders had backed them up, and why should they at this moment of national crisis be made the victims of foolish newspaper outcry and ignorant attacks in the House of Commons? To show that a large proportion of their work was non-military he would point to their collieries producting 2,500,000 tons of coal, hardly any of which went to the Government. They had on their books that day at Clydebank, and the other firms connected with them, between 300,000 and 400,000 tons of shipping either laid down or to be laid down the moment they had an opportunity of taking up the contracts. That meant that they were constructing or about to construct a fleet of between 30 and 40 huge vessels of 10,000 tons each—far in excess, so far as tonnage was concerned, of anything they had ever before done for his Majesty's Government, and he thought that that fact would convince the shareholders that whatever people might say, John Brown & Co. were dealing with the products of peace much more than with the products of war.

"Shell" Transport & Trading Company, Ltd.—Presiding at the annual meeting held at Winchester House, London, E.C., on June 22, Sir Marcus Samuel, Bt., referred to the serious transport difficulties that had occurred of late. Not only had delays occurred all over the world to their ships, but a large number of them were in Government service, in addition to the very many which had been occupied, practically exclusively, in carrying various products for the State. There had been a great increase in the cost of boats and a most grave addition to working costs, not only in the price of fuel, but also in provisions and wages. This was reflected in the figures of the Anglo-Saxon Petroleum Company, which, on a capital of £8,000,000, paid dividend of only £680,000, as against £870,000 on a capital of £6,000,000 the preceding year. Fortunately, the directors of the "Shell" Company anticipating that a great rise of price in cost of steamers would take place, ordered on advantageous terms no fewer than nine steamers and motor ships of a total deadweight of 46,650 tons, which would be a welcome addition to their fleet when they obtained delivery. Proceeding, he said that they had adapted their trade to the new position created by the opening of the Panama Canal. At both ends of the Panama Canal they had erected large storage for liquid fuel. The motor ship *Selene*, which was built in England, and provided with Diesel engines constructed by the Nederlandsche Fabrik of Amsterdam, sailed from Cardiff to the Gulf of Mexico, loaded her cargo there, motored through the Panama Canal to China, and there discharged her cargo, and proceeded to the Netherlands Indies to load a cargo of petrol for Europe. The length of this voyage was 26,000 miles, and was completed by this motor ship in 162 days, which included 27 days for loading and discharging and in harbour. The daily consumption of oil for all purposes was under 7 tons of liquid fuel, and she maintained a speed of 10 knots. Owing to the small consumption, she did not bunker from the time of leaving the Gulf of Mexico until her arrival at her Eastern loading port. Such a result, he said, went far to prove the practical success of the Diesel motor-boat, and also reflected great credit on the builders of the *Selene*.

Flower Motor Ship Company, Ltd.—Presiding at the annual meeting held at Winchester House, London, E.C., Sir Marcus Samuel referred to the motor vessel *Arum*, and said that she proceeded from London, to Newport, and thence to the Persian Gulf. Her engines worked quite satisfactorily up to her arrival in Port Said, but subsequently many adjustments had to be made. She loaded in the Persian Gulf, where she unfortunately grounded, and thence returned to discharge her cargo in London. After her repairs, the *Arum* proceeded from London to Newcastle-on-Tyne, loaded a full cargo of coal for Port Said, and thence she went to Alexandria, and loaded a cargo of cottonseed and onions to Hull, where she has now discharged. Constant troubles were developed with the engines. The motor ship *Arabis* only commenced working on February 1. Owing to the orders of the Admiralty, she was not able to run a trial trip, and, as a compromise, they arranged that she should do a trip from Newcastle-on-Tyne to Port Said, loading home at Alexandria a cargo of cottonseed and onions, and this voyage she duly fulfilled. Defects also developed in the engines of the *Arabis*, and he was glad to say that Messrs. Swan, Hunter & Wigham Richardson, Ltd., meeting them in a broad and liberal fashion, had agreed to accept the running of these two vessels as for their account, taking over all the risks and paying to the Flower Company 4 per cent. per annum on instalments which they had paid them. The builders will run the boats, if necessary, for a certain period, when the owners shall have the option of taking them over, if, as they are confident, they make them thoroughly satisfactory. From the running of the boats in the latter part of their voyages, after temporary repairs had been made at Gibraltar and Malta, there seemed a good possibility of the builders' confidence being justified.

[The report, to which reference has been made, states that the motor vessel *Abelia*, contracted for delivery in 1913, has not yet been delivered. The company has taken no further

commitments, and consequently it is not necessary to call up any further capital. Under these circumstances the capital remains intact, and after crediting interest earned and sundry profits, £7,955, and debiting expenses, £318, there remains at the credit of profit and loss account £7,637, out of which the directors recommend a dividend of 4 per cent. on the paid-up capital (less income-tax, which will be deducted at the rate of 1s. 6½d. in the £), leaving a balance of £637 to be carried forward.]

COMPANY REPORTS.

Cairn Line, Ltd.—Interim dividend of 10 per cent., free of income-tax, compared with 2½ per cent. 12 months ago.

West Hartlepool Steam Navigation Company, Ltd.—On account of arrears a dividend of 5½ per cent. is to be paid on the preference shares.

D. Davis & Sons, Ltd.—Interim dividend at the rate of 6 per cent. per annum on preference shares, and at the rate of 10 per cent. per annum on the ordinary shares for the half-year ending June 30.

Dundee, Perth & London Shipping Company, Ltd.—The results of the past year's trading show a net profit of £31,474. The directors recommend a dividend of 10 per cent., leaving £5,984 to be carried forward.

Burns, Philp & Co., Ltd.—The gross profits for the year ended March 31 last amounted to £362,923. After deducting salaries, expenses, depreciation, war loss, taxation, &c., there was a net balance of £83,655, against £131,282. It is proposed to pay 1s. per share dividend and 3d. per share bonus; to carry to reserve fund (making a total of £75,000) £10,000, and to carry forward £11,155. The operations of the company were seriously affected by the outbreak of war in August last, which caused a loss of £45,771, chiefly upon island produce shipments.

Prince of Wales Dry Dock Company (Swansea), Ltd.—The report for the year ended April 30 shows a profit of £10,889, and after providing for interest there remains £8,374. To this amount must be added £14,534 brought forward. The directors recommend a final dividend at the rate of 7 per cent. per annum, free of income-tax, making 10 per cent. for the year, and to carry forward £18,910. Profits and dividends for the past seven years are as follows:

Year.	Profit.	Dividend.
1909	5,014	5 per cent.
1910	7,014	7½ ,,
1911	6,157	7½ ,,
1912	6,275	7½ ,,
1913	8,643	10 ,,
1914	9,595	10 ,,
1915	10,890	10 ,,

The profit earned in the past 12 months establishes a new record for the company.

Marconi International Marine Communication Company, Ltd.—The report for 1914 states that during the last five months of the year the business suffered considerable disorganisation and some loss in consequence of the state of war. The net profit amounts to £55,668, after deducting £28,000 for depreciation and debenture interest, compared with a net profit of £37,029 for the preceding year. The revenue from ships' telegrams, subsidies, &c., amounted to £175,021, which is a substantial increase over the amount of £146,317 for 1913. The number of telegraph stations owned and worked by the company as public telegraph stations on the high seas increased from 788 at the end of 1913 to 905 at the end of 1914. During the current year further progress is being made, the number of steamers fitted to June 19 having increased to 970. There are now over 2,000 ships, exclusive of ships of war, fitted with Marconi telegraph stations and for the most part worked under the direction of this company and its associated companies. The Amalgamated Wireless (Australasia), Ltd., in which this company is interested, has paid a dividend of 4 per cent. in respect of the period to June 30, 1914, and an interim dividend of 2½ per cent. in respect of the half-year ended December 31, 1914. The amount to the credit of profit and loss account now stands at £64,855, including £6,067 carried forward from the preceding year. The directors recommend a final dividend for the year of 5 per cent., making 10 per cent. for the year. The company has sustained some loss in consequence of the attacks upon the mercantile fleet by enemy submarines, for which it is contemplated compensation will be received. However, the directors think it desirable that £10,000, a sum far in excess of all losses to date, should in the meantime be placed to the credit of a special reserve account, and having regard to the prevailing circumstances and the desirability of their holding a strong financial position, with ample cash resources to provide for the continuous increase of telegraph installations on board ships, it is deemed prudent to carry forward £20,747, after allocating £3,500 to the repayment of debenture account. The option on the 43,916 unissued shares for two years from June 27, 1913, mentioned in the last report, has not been exercised.

Chadburn's (Ship) Telegraph Company, Ltd.—A dividend has been declared on the ordinary shares of 10 per cent. per annum, less income-tax, for the half-year ending March 31, 1915, making with the interim dividend of 6 per cent. per annum already paid, 8 per cent. for the year.

Zeeland Steamship Company.—The report for 1914 shows that gross receipts were 3,268,491 gulden, against 2,695,411 gulden in 1913. The net receipts amounted to 1,604,188 gulden, being an increase of 500,000 gulden. The number of passengers increased from 169,705 to 200,580. The directors declare a dividend of 10 per cent., compared with 6 per cent. in 1913.

Kosmos Line.—The report for 1914 shows a profit of 4,193,590 marks, after retaining 2,500,000 marks for unfinished voyages and special expenses arising out of the war, compared with 7,708,320 marks for the previous year. The net profit is 4,013,460 marks, as against 8,221,346 marks the previous year. A dividend of 6 per cent. (16 per cent. the previous year) is announced and 32,980 marks carried forward.

German-American Petroleum Company.—The results of last year's trading show that, after setting aside 3,606,918 marks for depreciation and placing 1,600,000 marks to insurance reserve fund, there remains a net profit of 2,103,493 marks for last year, and the directors have declared a dividend of 22½ per cent., the same as for the previous year. The book value of the fleet stands at 32,300,000 marks, compared with 44,300,000 marks at the end of 1913.

Woodfield Steamship Company, Ltd.—A circular has been issued to the shareholders stating that they have decided to recommend the capitalisation of £82,458 of the reserve fund, and to distribute that sum as a bonus, free of income-tax, among the holders of the ordinary shares in proportion to the ordinary shares held by them, and to allot one preference share of 10s. and one ordinary share of 10s. for every two ordinary shares held by them, the sum of £82,458 referred to being applied in payment in full of the said shares.

NEWS PARAGRAPHS.

Egypt-Cyprus Service.—The Pantaleon Shipping Line has inaugurated a weekly service between Egypt and the three principal ports of Cyprus-Larnaca, Limassol, and Famagusta.

Argentine Wireless.—Owing to the war the period within which vessels flying the Argentine flag were to instal wireless telegraph apparatus has been extended to April 30, 1916.

Prices of Coal for Italy.—The President of the Board of Trade states that the declared value of coal exported to Italy in May, June and July, 1914, averaged 14s. 4d. per ton. In the first half of the present month it was about 18s. 9d.

Trent Navigation.—The Nottingham Corporation (Trent Navigation Transfer) Bill has been passed by a Select Committee of the House of Lords. The power of building on lands is restricted to building on lands belonging to the transferring company.

Staff Captains.—Following the practice on some other large liners the Canada Steamship Lines announce that they are appointing a staff captain on the following three vessels, the *Harmonic*, *Noronic*, and *Huronic*.

The War Loan.—The Management Committee of the Imperial Merchant Service Guild have decided, in addition to the £2,000 taken up in the last loan, to invest a further sum of £4,000 in the new War Loan out of the surplus funds of the Guild.

The Holt Education Trust.—The Education Committee of the Liverpool Corporation were on Monday this week furnished with particulars of the Holt Education Trust, established to commemorate the great services rendered to the Ocean Steamship Company, Ltd., by the two founders of the Company, the late Mr. Alfred Holt, and the late Mr. Philip Henry Holt. A sum of £20,000 has been handed by the Company to trustees, the income of which is to be applied for the purposes of higher education in the city of Liverpool

and district, in the promotion of which Messrs. Holt themselves, when living, took a large and active part. Mr. C. Sydney Jones, a present member of the firm of Messrs Alfred Holt & Co., is one of the trustees appointed, along with Alderman Alsop, Chairman of the City Education Committee.

Panama Canal Slide. Lloyd's Agent at Colon cables, under date of June 27: "Owing to slide in the Culebra Cut on Saturday the Panama Canal traffic is restricted to 23 ft. draught. Expect to have 30 ft. by Tuesday. Four vessels held up in the Canal; others waiting entry."

P.L.A. New Offices. On Wednesday of last week, Lord Devonport, the Chairman of the Port of London Authority, laid the foundation stone of the Authority's new offices in Trinity Square, the contract for which was let to Messrs. John Mowlem & Co., Ltd., some months ago. The ceremony was an informal one, only the members and principal officers of the Authority and the architect being present.

Odessa to Oust Hamburg. According to *Birshevija Wjedomosti*, a committee has been formed in Odessa to consider ways and means by which the European colonial produce market may be transferred from Hamburg to Odessa. After the Dardanelles are opened, the Russian company will establish direct shipping lines to Spain, to draw trade from Hamburg. Large warehouses are to be erected and a colonial produce bourse established.

New York : Far East Service. We understand that six new vessels allotted to the New York service by the Nippon Yusen Kaisha are the following:—

1	M	6,724 tons gross	10,450 d.w. cap.
1	M	6,724 ,,	10,450 ,,
1	M	7,375 ,,	10,950 ,,
1	M	7,298 ,,	10,950 ,,
1	M	7,500 ,,	10,950 ,,
1	M	7,500 ,,	10,950 ,,

The first two named were built by Messrs. Russell & Co., Port Glasgow, and delivered last year, the other four have just been completed in Japan. Of the Japanese built vessels two are fitted with geared turbines and two with superheaters. These vessels are running in the extra European service from the Far East, but owing to reduced exports from the United Kingdom are not required at present, consequently, the company has started the New York service earlier than intended. To replace these vessels on the European service six new vessels, the same size and type, have been ordered in Japan and are likely to be ready in good time to supply the necessary tonnage when the export trade from the United Kingdom improves either before or after the war terminates.

Deutsch-Australische Dampfschiffs-Gesell., Hamburg.—At an extraordinary general meeting following the ordinary general meeting on June 30, this company is to consider alterations in Sections 2, 11, 22 and 24 of the Statutes relating to the company's policy, management and insurance reserve.

Dollar Steamships Change Flag. The fleet of the Dollar Steamship Company, consisting of five steamers, will be changed from American to British registry, because of the obnoxious provisions of the American Seamen's Act. The headquarters of the company will probably be Vancouver.

Houlder Line Reconstruction.—At meetings of the various classes of shareholders of the Houlder Line, Ltd., held at the Great Eastern Hotel, London, E.C., the resolutions empowering the directors to make the reductions of capital in accordance with the reconstruction scheme to which we referred last week were adopted.

Rescues from the "Falaba."—The Board of Trade have awarded a piece of plate to Mr. Horatio George Wright, skipper of the steam drifter *Eileen Emma*, of Lowestoft, in recognition of his services to the shipwrecked crew and passengers of the steamship *Falaba*, of Liverpool, which was sunk in St. George's Channel on March 28.

Subsidised Brazilian Coastal Steamship Services.—According to the *Board of Trade Journal* the Brazilian Government has concluded a revised contract with the Maranhão Steam Navigation Company for the establishment of monthly services of steamers as follows:—(1) Between S. Luiz do Maranhão and Belém to the north; (2) between S. Luiz and Natal to the south; and (3) between S. Luiz and S. Bento. The Government is to grant to the company an annual subsidy of 270,000 milreis (£14,200). The contract will remain in force until April 20, 1922.

Asbestos for Shipbuilding and Roofing.—The correspondent of the Commercial Intelligence Branch of the Board of Trade in Hong Kong (Mr. E. A. M. Williams) reports that an opening exists in that Colony for the supply of asbestos of really good quality for shipbuilding and roofing purposes. United Kingdom manufacturers and exporters of asbestos materials may obtain the names of two firms in Hong Kong who might be willing to take up agencies on their behalf, on application to the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall Street, London, E.C.

"SHIPBUILDING AND SHIPPING RECORD" TABLE OF TRIAL TRIPS.

Date of Trial Trip.	Name of Vessel and Type.	Owners.	Builders.	Approx. Dimensions. — L. × B. × D.	Propelling Machinery and Builders of Machinery.	Remarks.
—	**Achilles,** ss. (oil fuel)	U.S.A. Government	Maryland Steel Co.			14·25 kts. average
May 18	**Kronentels** (cargo)	Deutsche Dampfschiff Gesell. "Hansa."	Flensburger Schiffsbau. Gesell.	477′ × 62′ 5½″	Quad. Exp. 4 000 i.h.p. 28½, 40½, 58½, 86 — 55	7,900 gross tons, 12,000 d.w. at 27′ 3″ draught. 12 kts.
June 12	**San Francisco,** ms. (cargo)	A.B. Nordsjöman, Stockholm.	A.S. Burmeister & Wain, Copenhagen.	362′ × 51′ 3″ × 25′ 6″	Two 4-jakl single-acting Diesel motors, each 6-cyl. Diam., 540 mm. Stroke, 730 mm. Revs., 140. H.P., 2 — 1,000. Twin screw. Burmeister & Wain.	6,510 tons d.w. 1st class, 8; 2nd class, 4 pass. Europe-American trade.
June 13	**Godafoss,** ss. (pass. and cargo)	Eimskipafelag Islands, Reykjavik.	Kjobenhavns Flydedok & Skibsværet.	225′ × 35′ × 23½′	Tr. Exp. 16½, 27, 44 — 30 and superheaters.	1,425 tons d.w. 10 kts. 42 1st class, 28 2nd class pass.
June 17	**Geo.** ss. (cargo)	Becker Bros., London	Russell & Co., Port Glasgow	331′ × 49′ × 24′ 8½″.	Clyde Shipbuilding & Engineering Co.	3,050 tons gross.
June 17	**Jan Pieterszoon Coen,** t.ss. (pass. and cargo).	Stoomvaart Maatschappy, Nederland	Nederlandsche Scheepsbouw Maatschappy.	503½′ × 60½′ × 39′	Two sets Tr. Exp. 3,000 i.h.p. ea.	About 11,000 tons gr. Pass.: 1st class 202; 2nd class, 120; 3rd class, 46; 4th class, 42; four cabines de luxe; crew 261. Amsterdam East Indies trade.
June 19	**Kalmarsund N.** (cargo steamer)	Angbatsaktie-Bolaget Kalmarsund	Oscarshamns Mekaniska Verkstads	67·55 m. × 10·95 m. × 4·14 m.	Tr. Exp. 445, 737, 1219 × 762 mm. 800 i.h.p. (Oscarshamns Works).	1,600 d.w. tons.
June 23	**Camito,** t.ss. (fruit-carrying)	Elders & Fyffes, Liverpool.	A. Stephen & Sons, Linthouse.	426′ 3″ × 52′ 2″ × 30′ 4″.	T. 6-cyl. 23½, 39½, 69 × 48. A. Stephen & Sons.	6,500 tons.
June 24	**Defender,** ss. (cargo)	T. & J. Harrison, Liverpool	Charles Connell & Co., Scotstoun.	482′ × 50′ 2″ × 33′ 2″.	Quad. Exp. 25½, 36½, 52½, 75 × 54. Dunsmuir & Jackson, Glasgow.	

"SHIPBUILDING AND SHIPPING RECORD" TABLE OF LAUNCHES.

Date of Launch.	Name of Vessel and Type.	Owners.	Builders.	Approx. Dimensions. — L × B. × D.	Propelling Machinery and Builders of Machinery.	Remarks.
—	**Isis**, ss.	Kosmos Line, Hamburg ..	J. C. Tecklenborg, Geestemunde.		Tr. Exp. 4,300 i.h.p.	13,300 tons d.w.
May 29	**Jacob Jones** t.ss. t.b.d.).	U.S.A. Government	New York S.B. Company, Camden, N.J.	310′	-	1,090 tons displ.
June 2..	**Sea Scout I.**, ss. (trawler)	Aberdeen Fish Supply Association.	Hall Russell & Co., Aberdeen.	115′ 22′ · 13′..	Hall, Russell & Co.	-
June 12	**Wainwright,** t.ss. (t.b.d.).	U.S.A. Government ..	New York S.B. Co., Camden, N.J.	310′ — · 97′ .	Parsons turbines. Geared turbines for cruising.	1,090 tons displ. 29½kts. est.
June 14	**Sam Weller,** ss. (tug)	Maryland Dredging Co., U.S.A.	Spedden S.B. Co., Baltimore, U.S.A.	82′ · 21′ 10′..	C.S.C. 12 · 24″	-
June 16	**Petrel** (lightship) ..	Irish Lights Commissioners	Dublin Dockyard Co., Ltd.	102′ · 24½′ · 13½′	- -	—
June 19	**Arizona,** U.S.S. (battleship)	U.S.A. Government ..	Brooklyn Navy Yard ..	624′ × 97¾′ × 28½′		12 14-in. guns. 31,400 tons displ. Sister ship to "Pennsylvania."
June 19	**Tarnan,** ss. (cargo) ..	Hallands Angbats Aktiebolag, Halmstad, Sweden	Lindholmens Verkstads Aktiebolag, Gothenburg.	177′ × 30′ × 13½′	Tr Exp. 14½, 24, 40 · 27. Lindholmens Co.	530 tons d.w. cap.

"SHIPBUILDING AND SHIPPING RECORD" TABLE OF SHIP SALES.

Name and type.	Tonnage.	Dimensions. Draught in ( ).	Sold by, to	Builders, hull and year.	Machinery and builders.	Remarks.
Ambra, ss. (iron, spar dk.)	2,913 gr. 1,827 net.	299¾′ × 40′ × 28½′	Hvalfangers Akt. Viking (P. Bogen) Sandefjord, to E. Stensrud, Skien	M. Pearse & Co., Stockton (1883)	21⅛, 35½, 58½ × 48 (Blair & Co., Stockton)	Price about £23,500.
Axminster, ss. (well dk.)	1,905 gr. 1,231 net.	269′ × 36¾′ × 16½′	R. Livingston & Co., London, to Minster SS. Co., Newcastle	Ropner & Son, Stockton (1891)	20, 35, 54 × 36 (Blair & Co., Stockton)	Price about £16,500.
Concadoro, ss. (spar dk.) (ex *Cabaza*)	1,793 gr. 1,133 net.	260′ × 36½′ × 16′	A. Giancovich & Co. (O. Olivetti fu F.), Trieste, to Isaac Ochberg, London	J. Laing, Sunderland (1888)	21, 34, 56 × 42 (G. Clark, Sunderland)	Previously sold for £5,350. Per Lachlan & Co., at Baltic, June 22, bidding started at £9,000; sold for £16,100.
Craigard, ss. ...	3,286 gr. 2,129 net. 5,700 d.w.	325½′ × 48′ × 23¼′	Craig Line SS. Co. (D. Russell & Co.), Leith to Edwards, Heppburn & Co., Cardiff	A. Rodger & Co., Port Glasgow (1901)	21½, 40, 65 × 42 (Clyde S.B. & Eng. Co., Port Glasgow)	Price £43,000.
Dagmar, ss. ..	3,072 gr. 1,963 net.	321¾′ × 47′ × 22½′	Angf. Aktieb Poseidon (J. M. Dannberg), Gothenburg to Rederiaktieb Transatlantic	Furness, Withy & Co., West Hartlepool (1904)	23½, 38, 64 × 42 (Richardsons, Westgarth & Co.)	—
Eugenia, ss. (spar dk.)	4,835 gr. 3,153 net.	385′ × 49¼′ × 18½′	Unione Austriaca di Nav. (Soc. Anon.), Trieste, to Italian buyers	Russell & Co., Port Glasgow (1906)	26, 42, 70 × 48 (D. Rowan & Co., Glasgow)	—
Jan Blockx, ss. (ex *Mamaia*)	1,366 gr. 846 net.	235′ × 37¼′ × 17′	Kolen en Scheepvaart Kantoor (J. F. & F. Schellen), Rotterdam to Norwegian buyers	Greenock & Grangemouth Dockyard Co., Grangemouth (1904)	18½, 30, 50 × 33 (Cooper & Greig, Dundee)	—
Kalypso, ss. (ex *Folgate*)	3,762 gr. 2,307 net.	340½′ × 47′ × 24½′	G. Vergottis (Plisson & Co.), Argostoli, to Blane, Wright & Co., Russian buyers per Glover Bros.	Swan, Hunter & Wigham Richardson, Newcastle (1904)	23½, 39, 66 × 45 (Wallsend Slipway Co., Newcastle)	Previously sold for about £24,500. Now sold for about £60,000.
Kortenaer, ss....	2,151 gr. 1,359 net.	286′ × 43¼′ × 19′	Stoom. Maats. Tromp. (J. F. & F. Schellen), Rotterdam to Brodrene Olsen of Stavanger	Greenock & Grangemouth Dockyard Co., Greenock (1901)	21, 35, 57 × 39 (Muir & Houston, Glasgow)	Price about £38,000.
Roisheim, ss. ...	1,847 gr. 1,114 net. 3,050 d.w.	265′ × 42′ × 20′ (17′ 6″)	Erling Lund, Christiana to Camillo Eitzen & Co., Christiana	Fredriksstad Mek. Verks., Fredriksstad (1914)	20½, 33, 56 × 36 (Fredriksstad Mek. Verks.)	Drawings, *S. & S.R.*, Dec. 3, 1914.
Rygja, ss. (spar dk.)	3,826 gr. 2,492 net.	364½′ × 50½′ × 15½′	J. L. Mowinckel, Bergen, to American buyers	J. L. Thompson & Sons, Sunderland (1905)	25, 41, 67 × 45 (J. Dickinson & Sons, Sunderland)	
Saint Mirren, s.v.	1,956 gr. 1,855 net.	272′ × 40′ × 23½′	"St. Mirren" Sailing Ship Co. (A. Mackay & Co.), Glasgow, to R. Thomas & Co., Liverpool	C. Connell & Co., Glasgow (1892)		Price about £11,125.
Stephanotis, ss. (spar dk.), renamed **Rackensack**	4,060 gr. 2,584 net.	350′ × 48′ × 17¼′	Stag Line (J. Robinson & Sons), N. Shields, to the Hackensack Co. (Brown, Jenkinson & Co.), London	Tyne Iron S.B. Co., Newcastle (1904)	24½, 41, 68 × 48 (N.E. Mar. Eng. Co., Newcastle)	—
Whindyke, ss. (ex *Loughwell*, ex *Selsdon*)	3,811 gr. 2,451 net. 6,550 d.w.	339½′ × 49½′ × 25½′ (23′ 6″)	Ross, Allan & Johnston, Glasgow, resold to British buyers	W. Gray & Co., West Hartlepool (1901)	25½, 40½, 67 × 45 (Cen. Mar. Eng. Works, West Hartlepool)	Sold in October by auction for about £18,950; resold for £45,000.
Woodbridge, ss.	3,605 gr. 2,331 net.	340′ × 48′ × 25′	Temperley SS.Co. (J. Temperley & Co.), London, by Salvage Assn., London, to C. Berg & Co., Cardiff	Irvine's S.B. Co., West Hartlepool (1900)	25, 40, 67 × 45 (W. Allan & Co., Sunderland)	Price about £16,000.
Woolston, ss. (ex *White Wings*, ex *Claverley*)	2,986 gr. 1,902 net. 5,500 d.w.	325½′ × 46½′ × 22½′ (22′)	Hants S.N. Co. (H. A. Williams & Co.), London, to S. Instone & Co., Cardiff	J. Blumer & Co., Sunderland (1900)	24, 40, 65 × 42 (J. Dickinson & Sons, Sunderland)	Sold in 1906 for £26,000 and again in 1913 for £24,000. Now sold for £40,000.

SHIPPING SHARE MARKET.

The stock and share markets concerned with transactions in steamship and kindred companies' securities have in common with all other markets been concerned more in the discussion of the influence of the terms of the new War Loan upon its particular section than upon the transaction of each business in shipping companies shares. There has been a very limited volume of selling, and it has mainly been confined to certain investors who wish to release capital in order either to take up the War Loan direct or to provide the necessary contingent subscription to the Issue for the purpose of converting a Consols holding. It is recognised among dealers that considerable changes in the yields obtainable from investments will be brought about by the placing of a British Government loan upon a 4½ per cent. basis. As far as concerns steamship companies' securities the effect is not expected to be very serious, because this class of stock does not figure in trustee lists.

The War Loan chiefly sets up a powerful competition with trustee stocks, all of which may now be expected to fall in price sufficiently to bring the yield up to at least the same figure as the British War Loan. Steamship companies' securities mainly yield around five per cent., and although investors may now expect to get a fractionally better return from them it is not anticipated that the fall in capital value will be very large. The Ellerman Line's report, which was published in our last issue, has given general satisfaction. The accounts cover fifteen months, and although during the latter part of this period large additional expenditure was incurred for war risk insurance and other working charges, the results show an improvement over those of 1913. A sum of £250,000 has been set aside as the nucleus of a reserve fund, and £500,000 has been earmarked for extra depreciation, &c. The Houlder Line scheme for the reorganisation of the capital, explained in our last issue, was also viewed favourably in the market, and there have been some further purchases of the preference shares on the continuation of the scheme by the preference shareholders and debenture stockholders of the company.

SHIPPING, SHIPBUILDING, ENGINEERING AND MARINE INSURANCE SHARE LIST.

SHIPPING AND DOCKS.

Name	Share and paid	Extreme quotations 1913.	Last ann. div. or per share.	Yield. %	Quotation, July 30, 1914.	Cash price during week.
	£					
African S.S. ..	20	21⅜—19 1/16	7	7¼	18—20	—
Alan Line .. Deb.	100	95—89	4	4⅜	93½—95½	—
Anchor Line .. Cum. pref.	10	10¾—10	5½	5½	10—10⅜	10⅜
D. Deb.	Stk.	98½—98⅜	4½	4⅛	104—106	104⅛
Argentine Nav. Cum. pref.	1	29/6—25/6	3	2	⅝—1 1/16	—
Do. .. .. Deb.	Bds.	104⅜—100¼	6	6	98—100	99
Australasian Un. S. Nav. Deb.	Stk.	84⅜—81½	4	4⅛	80—83	—
Belfast Steam "A"	10 opd	5—4½	5	5	4¼—5¼	—
British & African Nav. Deb.	Stk.	102—101	4½	4⅜	96½—98½	103
British India Nav. ... Deb.	Stk.	104—98⅜	4½	4	99½—100	100
Buenos Ayres SS. ... Cum. pref.	2	2½—1¾	5%	—	—	—
Cairn Line Deb.	Bds.	102—94	5	5⅛	81—93	—
Clan Line .. .. Ord.	10	14⅛—9	15	1 4/16	10½—11	13 1/16
Court Line ... Ord.	£1	—	10	9	—	1 1/16
Cunard SS. ... Ord.	1	35/8—28	20	9	1⅜—1½	2 1/16
Do. ... Cum. pref.	Stk.	103—97⅛	5	5	99—101	95
D. Deb.	Stk.	102⅛—99	4⅛	4	101—103	99¼
Elder Line ... Deb.	Stk.	103—100	4½	4	98—102	100
Elder Dempster ... Cum. pref.	1	1⅜—1 1/16	5%	5	1 1/16—1 1/16	1
Do. ... .. Deb.	Stk.	105—99⅛	5	5	102—104	99⅛
Ellerman Lines .. Pref. Ord.	10	10¾—10⅞	6¼	6	10—10⅛	9 15/16
D. ... Cum. pref.	10	10⅜—10⅞	4⅞	4½	10—10⅛	9 15/16
France Fenwick Cum. pref.	5	9/6—9/2	6	6	4⅜—5	4⅞
Furness, Withy Ord.	1	34⅜—25/6	10	8	1½—1⅝	1½
Do. ... Cum. pref.	10	9⅜—9¼	5	5	9⅝—10	9 15/16
General Steam Nav. Ord.	7½	6 1/16—5½	6	8	5¾—5⅞	5⅞
Do. .. .. Pref.	8	7¼—7⅛	6	7⅜	7¼—7⅜	6⅞
Houlder Line ... Cum. pref.	5	5/—80/-	Nil	Nil.	2⅜—2⅝	4⅛
Do. ... .. Deb.	Stk.	84⅛—80	4⅜	5⅛	81—86	83
Houlder Bros. ... Cum. pref.	5	4⅛—3	5⅜	5⅛	4⅜—4⅝	4⅝
Do. .. .. Deb.	Stk.	85—78	4⅜	5	81—86	99⅜
India Gen. Nav. & Rly. .. Ord.	10	9⅜—7 1/16	8	10	9—10	8
Indo-China N. ... Pref. Ord.	5	5 5/8—87/6	6	6⅞	3⅛—4¼	4⅛
Irrawaddy Flotilla	40	125—114	15	12 5/8	126½—128½	—
King Line ... ... Ord.	10	9 1/16—8	8	7⅛	8¼—9¼	10¼
La Guaira Harbour ... Deb.	Stk.	87—79	5	—	78—80	73
Lampert & Holt .. Cum. pref.	£1	1⅛—7/6	6	6	1⅝—1 1/16	1
Leyland (F.) ... Cum. pref.	10	11—9⅜	10	10	7¼—8¼	10
Do. ... ... Deb.	100	99⅛—95⅛	4	4	99—101	—
Mercantile SS. ... ... Ord.	5	8 1/16—6¼	17½	14 1/2	6—6½	8⅛
Do. ... .. Pref.	1	18/—16/3	5	5¼	8/4—1	1 1/16
Moor Line ... ... Ord.	10	14—11 5/16	15	—	—	—
Nelson Steam Nav. ... Deb.	100	103⅜—99	5	4⅝	99⅜—101⅛	100⅝
New Zealand ... ... Ord.	8	20⅛—10⅜	8	5	14⅜—15⅜	20⅛
Do. ... ... Deb.	Stk.	95—92⅜	4	4⅛	92—94	90⅛
Nitrate Producers SS. ... Ord.	5	8⅜—8	12½	7⅛	8—8⅛	12⅜
Do. ... Cum. pref.	5	5—97/6	5	—	4⅛—5	—
Oceanic Steam. Nav. .. Deb.	100	100—96⅛	4½	—	97—99	99⅛
Orient Steam Nav. Co. Cum. pref.	10	10⅛—9 1/16	5	5 1/16	9⅜—10	9 15/16
Do. ... .. Deb.	100	99—94⅜	4½	4⅜	98—100	97⅛
P. & O. S. N. ... Cum pref.	100	125⅜—107	5	5	109—112	100
Do. .. ... Def.	100	350—270	15	6	270—290	250
Do. ... .. Deb.	Stk.	91—83	3½	4⅛	84—86	80⅛
Prince Line	1	25/3—20/-	5	3⅛	1—1⅛	1⅛
R.M.S.P. ... ... Ord.	100	143—100½	Nil.	Nil.	82—87	65½
D. ... ... Pref.	Stk.	100⅞—98	5	5⅛	98—101	92¼
Do. .. ... Deb.	Stk.	104⅜—100⅜	4½	4⅜	101—103	99
Shaw, Savill & Alb. Cum. pref.	5	5⅜—98⅜	5	—	4¾—5	—
Shell Transport .. Ord.	1	5 1/16—96 10⅜	30	5⅝	4—4⅛	4⅜
Do. .. Cum pref.	10	11 7/16—10	5	4⅞	10⅜—10⅝	10⅜
Sutherland SS. Co. ..	£1	1¼—1	20	13⅓	1—1⅛	1⅛
Union-Castle SS. Cum. pref.	10	10—9½	4⅛	5	8¾—9⅛	8⅛
Do. ... ... Deb.	Stk.	95⅛—92	4	4⅛	93—95	9⅞
Union SS. of N. Z. ... Deb.	Stk.	95—91	—	—	—	—
West Hartlepool ... ... Pref.	10	4⅞—3 1/16	Nil.	Nil.	2½—3½	7¼

INSURANCE.

Alliance	20 (2·4 pd.)	12 7/8—11⅛	12/-	5⅛	11⅞—12⅛	10 1/16
Do. (new shares) ..	1	14 7/16—12⅞	12/-	5⅛	13⅛—14⅛	11¼
Indem. Mutual Marine	15 (3 pd.)	10 1/16—8⅛	11⅛	5	10—11	10⅛
London Assurance	25 (12½ pd.)	54—49	20	4⅛	54—56	50¼
Marine Insurance	25 (15 pd.)	38⅛—36⅛	45/-	6⅛	38⅛—39¼	40⅛
Maritime Insurance ..	10 (2 pd.)	5⅝—4 1/16	12½	—	8 1/16—5/8	—
Merchants' Marine Insurance ..	10 (2½ pd.)	66 3/4—61/3	7⅛	4¼	4—4⅛	4 1/16
N. British & Mercantile Ord.	25 (6½ pd.)	40⅛—38⅛	40/-	5⅛	40⅝—41⅛	35⅛
Do. Pref.	Stk.	100⅛—95⅞	4	4⅛	98—100	89¼
Phœnix Assurance	10 (1 pd.)	7 1/16—7	40	6¼	7¼—8¼	6¼
Reliance Marine	10 (2 pd.)	7—6½	17½	4 1/16	7 9/16—7⅝	7⅛
Royal Exchange Assurance .	Stk.	210—196⅛	10	5	213—218	200½
Sea Insurance ...	10 (2 pd.)	20—17⅝	8	4	20—21	20 1/16
World Marine, Limited	5 (2 pd.)	25/—23 1/2	5	5⅛	1 5/16—1 1/16	1 1/16

* With arrears. † Includes 2½% bonus.

IRON AND STEEL.

Name.	Share and paid.	Extreme quotations, 1913.	Last ann. div. % or per share.	Yield. %	Quotation, July 30, 1914.	Cash price during week.
	£					
Babcock & Wilcox . ... Ord.	1	69 4½—56 3	16	5½	2⅝—2⅝	2⅝
Baldwins .. Cum. pref.	1	22/6—21/3	5⅛	5 5/16	1 3/16—1 5/16	1 1/16
Do. ... . .. Deb.	Stk.	100¼—100⅛	4⅛	4⅛	97—99	99
Bayliss, Jones ... Cum. pref.	1	—	5	7½	⅜—⅝	⅜—11/16
Bell Bros. . .. Cum. pref.	10	12 1/16—11	11	5¼	11¼—12¼	10 1/16
Do. ... ... Deb.	Stk.	98—96⅜	4	4 1/16	96—98	96 - 98
Bessemer (Henry) .. Ord.	1	1 1/16—1 1/16	10	8⅛	1 1/16—1 1/16	1 1/16
Bolckow Vaughan ... Ord.	1	22/6-19/4½	6	6	1 1/16—1⅛	1 1/16
Do. ... ... Cum. pref.	20	21¼—20/-	5	4¼	20—21	20 21
Cargo Fleet Iron ... .. Ord.	1	11 10⅛—7/6	2½	5	½—⅝	⅝
Do. ... ... Deb.	100	91—85½	4⅛	—	89—92	89½
Consett Iron Co. ... Ord.	1	88/6—74/6	30	7½	3½—3⅞	3½
Dominion Iron & Steel	Bds.	100⅛—88⅜	5	—	83—87	76⅝
Dorman, Long ... ... Ord.	1	21/6—16/9	7½	8¼	20—21	20 21
Do. . .. ... Deb.	Stk.	88½—85⅜	4	4⅛	87—90	84½
Ebbw Vale Steel & Iron Ord.	1	18/—16/-	10	10	2⅝—2⅞	1 15/16
Guest, Keen & Nettlefds Ord.	1	68 9—61/3	15	4½	3 5/16—3 7/16	3⅜
Do. ... ... Cum. pref.	5	5⅜—5⅝	5	4⅝	5 5/16—5 7/16	5⅜
Do. ... ... Deb.	Stk.	100⅛—95⅜	4	4½	96—98	94½
Hadfield's Steel Foundry Ord.	1	63/—58 9	22½	7 1/16	3—3⅛	3 1/16
Hawthorn (R. & W.) Leslie Ord.	10	13—12	10	7½	13⅜—13⅝	13¾ 14
Hobotson Bros. ... ... 5 (4 pd.)		7—5⅛	10	7 1/16	6—6⅛	6 6½
Jessop (W.) & Sons ... Ord. 5 (4 pd.)		6⅝—6⅜	15	11 5/16	6⅛—6⅜	6⅜
Lanarkshire Steel Cum. pref.	10	7½—6⅛	5	6 7/16	5½—6⅝	6
Lysaght (J.) ... Cum. pref.	1	27/6—25/-	6	1 1/16	1¼—1⅜	5
Do. ... ... Deb.	Stk.	108⅜—102⅜	4½	—	104—106	—
Manganese Bronze ... Ord.	1	⅜—⅜	6	11	⅜—⅜	⅜
Do. .. Cum. pref.	1	1—⅞	6	6 5/8	¾—1	⅞
North Eastern Steel Deb.	Stk.	89—92	4½	—	—	—
Palmers Ship & Iron "A"	1	⅝—⅜	Nil.	Nil.	⅜—⅝	—
Scott (Walter) ... ... Ord.	1	16—14/6	5	6 1/16	⅝—¾	⅝—¾
Do. ... ... Def.	Stk.	86—82	4	4⅜	81—82	89 91
Sheffield Forge ... .. Ord.	1	1⅞—1⅜	12½	7	1⅝—1¾	1 15/16
Shelton Iron & Steel ... Deb.	100	99½ 90	5	5⅛	93—98xd	93 - 98
S. Durham Steel & Iron Ord.	1	35/—23 6	10	6 1/16	1⅜—1⅝	1⅜
Do ... ... Cum. pref.	1	20/6—19/-	6	5 1/16	3 1/16—1 3/16	1 1/16
Do. ... . Deb.	Stk.	9 —98	4½	4⅜	90—92	90—92
Steel Co. of Scotland ... Ord.	10	12⅜—8⅜	5	5⅜	8½—9	8¼—9¼
Stewarts & Lloyds Pref. ord.	10	21 1/16—20	10	4½	20—21	19
Do. ... ... Cum. pref.	10	14⅜—13⅛	6	4⅜	11 3/16—13 7/16	13 1/16
Stone (J.) . ... Cum. pref.	10	9⅛—9	5	5⅓	8⅞—9 xd	9 1/16
United States Steel ... Ord.	100$	71⅛ 50	3	4¼	61—61⅛	63¼
Do. ... .. Cum. pref.	100$	113¾—104⅛	7	6⅜	112—113	114
Vickers Ltd. ... ... Ord.	1	43/6—33/3	12½	6⅜	11 1/16—11⅜	11⅜
Do. ... ... Pref.	Stk.	106⅜—99	5	5	104—107	106⅜
Do. ... ... Deb.	Stk.	100⅜—91⅛	4	4⅛	96⅛—98⅜	93
Weardale Steel ... Def. ord.	1	21/—17/-	6	7⅛	⅜—1 1/16	1 1/16
Do. ... . Cum. pref.	1	20 1/2—18/-	6	6⅛	1 1/16—1	1
Do. ... ... Deb.	Stk.	77—73⅛	5	—	77—80	—
Workington Iron & Steel Ord.	1	16/6—12/3	6	8⅛	⅜—⅝	½

SHIPBUILDING AND MARINE ENGINEERING.

Armstrong, Whitworth Ord.	1	60—39⅛	12½	6	13½—2⅜	1⅜
Do. ... ... Cum. pref.	5	95—84/6	4	4⅛	4⅜—4 1/16	4 1/16
Do. ... ... Deb.	Stk.	98¼—94⅛	5	5⅛	96—98	96
Beardmore (W.) ... ... Deb.	100	96⅜—91⅛	4⅛	4⅜	94—96	94¼
Brown (John) .. ... Ord.	1 (15s. pd.)	23/—17/9	10	6⅜	⅝—⅞ xd	1 1/16
Do. ... ... Cum. pref.	10	10⅛—9 1/16	5	5 1/16	9⅝—10xd	9⅝
Cammell Laird ... ... Ord.	5	3⅜—2⅜	7½	8	3⅜—4⅛	4
Do. . .. Cum. pref.	5	92/6—79/-	5	6	4¼—4⅝	4
Do. ... ... Deb.	100	90½ 84⅛	4⅛	5	92—94	91½
Dunlop (Jas.) ... Ord.	1	18 6—17/6	Nil.	—	⅛—⅜	—
Do. ... Cum. pref.	1	1⅛—⅝	6	7⅛	⅝—1	⅝
Fairfield Shipbldg Cum. pref.	10	10—7⅞	6	8⅜	—	7⅝
Fleming & Ferguson .. Ord.	10	20½—12⅜	10	6 1/16	14¼—14½	15
Gray (Wm.) ... ... Deb.	100	100⅝—100	4½	4½	100-102	100
Henderson (D. & W.) Cum. pref.	1	⅜—7/16	5	12	7/16—7/16	⅜
Richardsons Westgarth Ord.	1	3/6—1/9	Nil.	Nil.	1/16—⅛	1/16
Do. ... ... Cum. pref.	1	9 9—4/3	Nil.	Nil.	⅜—½	⅜
Do. ... . Deb.	Stk.	70—58	4⅝	6½	55—58	69⅝
Simons (W.) ... Cum. pref.	10	10½—10	5	4⅝	10¾—10⅝	10¼
Stephenson (R.) ... ... Ord.	1	66⅝—53	Nil.	Nil.	—	—
Do. ... ... Deb.	Stk.	66½—63	Nil.	Nil.	—	—
Swan, Hunter & W. R. ... Ord.	1	19 10½—16—	†10	10⅛	1 1/16—1	1 1/16
Do. .. .. Cum. pref.	1	19 9—17 9	5	5⅛	1 1/16—1	1 1/16
Do. ... . Deb.	Stk.	90⅛—88	4½	—	90—93	—
Thornycroft John I. ... Ord.	1	27 6—12/6	8	8	⅝—¾	1
Do. ... ... Cum. pref.	1	19 3—11 3	6	7⅛	¾—⅞	⅞
D. .. .. .. Deb.	100	94—91	5	5 1/16	88—92	94
Wallsend Shipway .. Ord.	1	1⅛—1/16	10	10	1 1/16—1 1/16	—
Do. .. ... Cum. pref.	1	20—20/-	5	—	1 1/16—1 1/16	—

Buyers' Guide.

LIST OF THE LEADING MAKERS OF SHIPBUILDING & SHIPYARD & DOCK MACHINERY, APPLIANCES, PLANT & STORES.

ACCOMMODATION LADDERS—
Linkleter's Patent Ship Fittings Co., Hudson St., North Shields.

ACETYLENE—
Carbic Ltd., 51, Holborn Viaduct, London, E.C.

AERIAL ROPEWAYS—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.

AIR COMPRESSORS—
Belliss & Morcom, Ltd., Birmingham.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, S.E.

AIR PUMPS—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Belliss & Morcom, Ltd., Birmingham.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Dawson & Downie, Elgin Works, Clydebank.
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.
Weir, G. & J., Ltd., Cathcart, Glasgow.

ALUMINIUM GOODS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

ALUMINIUM PAINT—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

ANCHORS—
Hingley & Sons, Ltd., Netherton Iron Works, Dudley, Staffs. [on-Tyne.
Spencer, John, & Sons, Ltd., Steel Works, Newburn-
Sykes, Richard, & Son, Ltd., Cradley Heath.
Taylor, Samuel, & Sons (Brierley Hill), Ltd., Brierley Hill, Staffs.
Wright, Joseph, & Co., Ltd., Tipton, Staffs.

ANTI-CORROSIVE COMPOSITIONS—
Briggs, W., & Sons, Ltd., Dundee.
Hamilton, Archd., & Co., Possilpark, Glasgow.
Holzapfels, Ltd., Newcastle-on-Tyne.
Hoyle, Robson, Barnett, & Co., Ltd., St. Nicholas Chambers, Newcastle-on-Tyne.
Milburn, A., & Co., Sunderland.
Wailes Dove Bitumastic Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.
Websters Ltd., Hull.

ANTI-FOULING COMPOSITION—
Holzapfels, Ltd., Newcastle-on-Tyne.
Websters Ltd., Hull.

ANTI-FRICTION METALS—
Billington & Newton, Ltd., Longport, Staffs.
Bowran, Robt., & Co., Ltd., Newcastle-on-Tyne.
Delta Metal Co., Ltd., East Greenwich.
McConwell, A., & Co., Ltd., 60, Drury Buildings, Water St., Liverpool.

ARMOUR PLATES—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Openshaw Works, Manchester.
Brown, John, & Co., Ltd., Atlas Works, Sheffield.

ASBESTOS FITTINGS—
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

ASBESTOS GOODS— [Town, N.W.
Jones, Fredk., & Co., Ltd., Perren Street, Kentish
Walker, Jas., & Co., 11, Bishop Court, Anderston, Glasgow.

ASH BAGS—
Speedings Ltd., Sail Works, Sunderland.

ASH BINS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

ASH DISCHARGING APPLIANCES—
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh
Trewent & Proctor, F. J., Ltd., 43, Billiter Buildings, E.C.

AWNINGS—
Speedings Ltd., Sail Works, Sunderland.

BARROWS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

BARROWS (Cargo)—
Edina Manufacturing Co., 19h. Broad Wynd, Leith.

BEDDING & NAPERY— [Glasgow.
Stewart, Archibald & Co., 40-48, Union Street,

BEMAL CONDENSER TUBES—
The Yorkshire Copper Works, Ltd., Leeds.

"BITUMASTIC" ENAMEL MANUFACTURERS—
Wailes Dove Bitumastic Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.

BLINDS—
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield.

BLOCKS—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.
Higginson & Co., 7, Hurst Street, Liverpool.

BLOWERS—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford. [Belfast.
Davidson & Co., Ltd., Sirocco Engineering Works,
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

BOATS—
Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Renfrew, Scotland.

BOILERS—
Central Marine Engine Works, West Hartlepool.
Elliot & Jeffery, East Dock, Cardiff.
Harris Bros., Ltd., Cambrian Dry Docks, Swansea.
Hawthorne, R. & W., Leslie & Co., Ltd., St. Peter's, Newcastle-on-Tyne.
Howden, James, & Co., Ltd., Scotland St., Glasgow.
Perman & Co., Ltd., 82-83, Fenchurch Street, E.C.
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

BOILER CLEANER—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.

BOILER COMPOSITION—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish

BOILER COVERING— Town, N.W.
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.
Walker, Jas., & Co., 11, Bishop Court, Anderston,

BOILER MOUNTINGS— Glasgow.
Cockburns Ltd., Cardonald, Nr Glasgow.
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

BOILER PLATES (Steel)—
Leeds Forge Co., Ltd., Leeds.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

BOILER PRESERVATIVE—
Atlas Preservative Co., Ltd., Deptford, S.E.

BOILER TUBES—
Yorkshire Copper Works, Ltd., Leeds.

BOLTS AND NUTS—
Coventry Chain Co., Ltd., Coventry.

BORING MACHINES—
Armstrong, Sir W. G., Whitworth & Co., Ltd. Elswick Works, Newcastle-upon-Tyne.
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.
Greenwood & Batley, Ltd., Albion Works, Leeds.

BRASS & COPPER FITTINGS—
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

BRASS & COPPER RODS—
Delta Metal Co., Delta Works, East Greenwich,

BRASS FOUNDERS— London, S.E.
Billington & Newton, Ltd., Longport, Staffs.
Chambers, John, Ltd., Lowestoft.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow. [Street, Glasgow.
McGeoch, Wm., & Co., Ltd., 28, West Campbell
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.
Williams, Wm., Alexandra Brass Foundry, Cardiff.

BRASS NAME-PLATES—
Metograph Co., 280, Cathedral Street, Glasgow.
Rennie & Co., North Greenhill Road, Paisley.

BRASS TUBES—
Yorkshire Copper Works, Ltd., Leeds.

BRASSWORK—
Laycock, W. S., Ltd., Victoria Works, Millhouses,

BRONZE (Manganese)— Sheffield.
Billington & Newton, Ltd., Longport, Staffs.
Bowran, Robt., & Co., Ltd., 4, St. Nicholas Buildings, Newcastle-on-Tyne.
Callender's Cable & Construction Co., Ltd., Belvedere, Kent.
Delta Metal Co., Ld., E. Greenwich, London, S.E.
Stone, J., & Co., Ltd., Deptford, London, S.E.

BUCKETS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

BUNTING—
Riley, Edward, & Co., Leeds.

BUOYANT DECK SEATS— [Liverpool.
Crichton, C. & H., Ltd., Huskisson Engine Works,
Linkleter's Patent Ship Fittings Co., Hudson Street, North Shields.

BUOYS—
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.
Hingley & Sons, Ltd., Netherton Iron Works, Dudley, Staffs.

CABINET MAKERS—
Stewart, Archibald & Co., 40-48, Union Street, Glasgow.

CABLES (Chains)—
Hingley & Sons, Ltd., Netherton Iron Works, Dudley, Staffs.
Sykes, Richard, & Son, Ltd., Cradley Heath.
Taylor, Samuel, & Sons (Brierley Hill), Ltd., Brierley Hill, Staffs.
Wright, Joseph, & Co., Ltd., Tipton, Staffs.

CAISSONS & DOCK GATES—
Swan, Hunter, & Wigham Richardson, Ltd.,

CALORIFIERS— Wallsend-on-Tyne.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

CAPSTANS (Electric)—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Engine Works, Elswick.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh

CARGO BLOCKS—
Higginson & Co., 7, Hurst Street, Liverpool.

CARPETS—
Stewart, Archibald & Co., 40-48, Union St., Glasgow.

CASE HARDENING BOXES—
Else, John, & Son, Ltd., 48, Muntz St., Birmingham

CASE HARDENING COMPOSITION—
Else, John, & Son, Ltd., 48, Muntz St., Birmingham

CASE HARDENING OIL—
Else, John, & Son, Ltd., 48, Muntz St., Birmingham

CAST BRASS PLATES—
Brown, Robert, & Co., 12, Espedair St., Paisley.

CASTINGS (Steel)—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Steel Works, Elswick.
Brown, John, & Co., Atlas Works, Sheffield, and Clydebank, Nr. Glasgow.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

CASTINGS (Steel, Iron and Brass)—
Chambers, John, Ltd., Lowestoft.
Darlington Forge Co., Ltd., Darlington.
Hamilton, A., & Sons, 13, Bute Crescent, Docks, Cardiff.
McRobie, John & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

CHAINS—
"The Coventry" Chain Co., Ltd., Spon End Works, Coventry.

CHRONOMETERS—
Kelvin, Bottomley & Baird, Ltd., 16, 18, 20, Cambridge Street, Glasgow.

COAL—
Britannic Merthyr Coal Co., Ltd., Cambrian Bldgs., Cardiff.
Cambrian Collieries, Ltd., Cambrian Bldgs., Cardiff.
Davis, D., & Sons, Ltd., Cymric Bldgs., Cardiff.
Glamorgan Coal Co., Ltd., Cambrian Bldgs., Cardiff.
Harrisons (London), Ltd., 66, Mark Lane, E.C.
Naval Colliery Co. (1897), Ltd., Cambrian Bldgs., Cardiff.
Powell Duffryn Steam Coal Co., Ltd., Cardiff.

COAL-LOADING PLANT—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.

COMPASSES (Ship)—
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.
Kelvin, Bottomley & Baird, Ltd., 16, 18, 20, Cambridge Street, Glasgow.

CONDENSERS—
Belliss & Morcom, Ltd., Birmingham.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Dawson & Downie, Elgin Works, Clydebank.
Royles Ltd., Irlam, Nr. Manchester.
Weir, G. & J., Ltd., Cathcart, Glasgow.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

CONDENSER TUBES (Brass and Copper)—
The Yorkshire Copper Works, Ltd., Leeds.

CONTROLLERS & CONTROL GEAR—
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

CONVEYORS—
Armstrong, Sir W. G., Whitworth & Co., Ltd. Elswick Works, Newcastle-upon-Tyne.
Mather & Platt, Ltd., Manchester.

COOKING APPARATUS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Grieve, T., & Sons, Bedford Street, North Shields

COPPER PIPES—
Yorkshire Copper Works, Ltd., Leeds.

COPPERSMITHS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Chambers, John, Ltd., Lowestoft.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

COPPER TUBES—
Yorkshire Copper Works, Ltd., Leeds.

CORK INSULATION—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W. [Newcastle-on-Tyne.
Newalls Insulation Co., 31, Mosley Street,

CORRUGATED IRON—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

COUNTER (Engine)—
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.

CRAB WINCHES—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.

CRANES—
Ransomes & Rapier, Ltd, 32, Victoria Street, London, S.W.

CUTTERS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.

CYLINDERS (Copper)—
The Yorkshire Copper Works, Ltd., Leeds.

DELTA METAL—
Delta Metal Co., Delta Works, East Greenwich, S.E.

DERRICKS & DAVITS (Tubular Steel)—
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

DISTILLING APPARATUS—
Royles Ltd., Irlam, Nr. Manchester.

DIVING APPARATUS—
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, S.E.
Mining Engineering Co., Ltd., Meco Works, Moorfields, Sheffield.

DOCK & SHIP LIGHTING—
Carbic Ltd., 51, Holborn Viaduct, London, E.C.

DOCK GATES—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Engine Works, Elswick.
Chalmers, Wm., & Co., Ltd., Rutherglen, Nr. Glasgow.
Hamilton, Wm., & Co., Ltd., Port Glasgow, Scotland.
Swan, Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne.

DOORS (Watertight)—
British Thomson-Houston Co., Ltd., Rugby.
Stone, J., & Co., Ltd., Deptford, S.E.

BUYERS' GUIDE—*continued.*

DREDGE PLANTS—
[illegible], Wm., & Co., Ltd., Rutherglen, Nr. Glasgow.
Simons Wm. & Co., Ltd., Renfrew, Nr. Glasgow.

DREDGING
[illegible] & Contracting Co., Ltd., Queen Anne Chambers, Westminster, London, S.W.

DRILLING MACHINES
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle upon Tyne.
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

DRILLS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Openshaw Works, Manchester.
[illegible] Street, Birmingham.

DRILLS (Pneumatic and Electric)
[illegible] Mercer Packing Co., Ltd., Bradford.

DROP FORGINGS & STAMPINGS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle upon Tyne.

DRY FITTINGS (Laundry)—
Bradford, T., & Co., Salford, Manchester.

DYNAMOS—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
[illegible], J. H., & Co., Portland Road, Newcastle-on-Tyne.

ELECTRIC CRANES—
Armstrong, Sir W. G. Whitworth & Co., Ltd., Engine Works, Elswick.
Petty, Henry, & Co., Ltd., Croydon Works, Leeds.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [Edinburgh.
[illegible] Scott & Co., Ltd., Loanhead.
Mather & Platt, Ltd., Manchester.
[illegible] & Rapier, Ltd., 32, Victoria Street, London, S.W.

ELECTRIC DERRICKS—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.

ELECTRIC DYNAMOS & MOTORS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
Mather & Platt, Ltd., Manchester.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRIC FITTINGS—
Durham, Churchill & Co., Grimesthorpe, Sheffield.

ELECTRIC HEATING & COOKING APPARATUS—
British Thomson-Houston Co., Ltd., Rugby.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.

ELECTRIC LAMPS—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Kelvin, Bottomley & Baird, Ltd., 16, 18, 20, Cambridge Street, Glasgow.
McGeoch, Wm., & Co. Ltd., 28, West Campbell St., Glasgow.

ELECTRIC LIGHTING—
[illegible] H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Mather & Platt, Ltd., Manchester.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRIC-LIGHTING PLANT—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
Mather & Platt, Ltd., Manchester.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRIC MOTORS—
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
Mather & Platt, Ltd., Manchester.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRIC WIRES—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.

ELECTRICAL CONTRACTORS—
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow. [Glasgow.
Martin, W. C., & Co., 10, West Campbell Street, Glasgow.
Mather & Platt, Ltd., Manchester.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRICAL ENGINEERS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.
Graham, Alfred, St. Andrew's Works, Crofton Park Road, S.E.

ELECTRICAL ENGINEERS (*contd.*)—
Holmes, J. H., & Co., Portland Road, Newcastle-
Mather & Platt, Ltd., Manchester. [on-Tyne.
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRICAL INSTRUMENTS (Ammeters)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-

ELECTRICAL INSTRUMENTS (Circuit Breakers)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

ELECTRICAL INSTRUMENTS (Relays)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

ELECTRICAL INSTRUMENTS (Voltmeters)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-

EMERY WHEELS—
Sterne, L., & Co., Ltd., Crown Iron Works, Glasgow

ENAMEL MANUFACTURERS—
Holzapfels, Ltd., Newcastle-on-Tyne.
Wailes, Dove & Co., Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.
Websters Ltd., Hull.

ENGINE (Electric Light)—
Bellis & Morcom, Ltd., Birmingham.
Greenwood & Batley, Ltd., Albion Works, Leeds.

ENGINES (Land)—
Chambers, John, Ltd., Lowestoft.

ENGINES (Marine)—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Central Marine Engine Works, West Hartlepool.
Chambers, John, Ltd., Lowestoft.
Hawthorn, R., & W. Leslie & Co., Ltd., St. Peter's, Newcastle-on-Tyne.
Howden, James, & Co., Ltd., Scotland St., Glasgow.
Perman & Co., Ltd., 82-83, Fenchurch Street, E.C.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

ENGINE & DECK STORES—
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.
Metallic Valve Co., Colonial House, Water Street, Liverpool.

ENGINE AUXILIARIES—
Aspinall's Patent Governor Co., 7, Strand Street, Liverpool.

ENGINE FITTINGS—
Aspinall's Patent Governor Co., 7, Strand Street, Liverpool.
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

ENGINE-ROOM OUTFITS—
Grieve, T., & Sons, Bedford Street, North Shields.
Newalls Insulation Co., 31, Mosley Street, Newcastle-on-Tyne.

ENGRAVERS—
Brown, Robert, & Co., 12, Espedair St., Paisley.

EVAPORATORS—
Central Marine Engine Works, West Hartlepool.
Royles Ltd., Irlam, Nr. Manchester.
Weir, G. & J., Ltd., Cathcart, Glasgow.

EXPLOSIVES— [Scotswood Works.
Armstrong, Sir W. A. Whitworth & Co., Ltd.,

EXTRUDED METALS (Brass, Bronze, Copper, Delta Metals)—
Delta Metal Co., Ltd., E Greenwich, London, S.E.

FANS—
Adam, J. M., & Co., Greenfield Iron Works, Dalmarnock, Glasgow.
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [Belfast.
Davidson & Co., Ltd., Sirocco Engineering Works,
Hogan & Wardrop, 2, Gresham Buildings, Basinghall Street, London, E.C.
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

FEED-WATER HEATERS—
Central Marine Engine Works, West Hartlepool.
Royles Ltd., Irlam, Nr. Manchester.
Weir, G. & J., Ltd., Cathcart, Glasgow.

FILES—
Brown, John, & Co., Atlas Works, Sheffield.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

FILTERS (Marine)—
Central Marine Engine Works, West Hartlepool.
Chambers, John, Ltd., Lowestoft.
Cockburns Ltd., Cardonald, Nr. Glasgow.
Mather & Platt, Ltd., Manchester.

FIREBARS—
Liverpool Patents Co., Ltd., Derby Square, James Street, Liverpool.

FIRE EXTINGUISHERS—
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Mather & Platt, Ltd., Manchester.

FIRE-FIGHTING APPLIANCES—
Mining Engineering Co., Ltd., Meco Works, Sheffield.

FLAGS—
Riley, Edward, & Co., Leeds.
Spencer, Ltd., Sail Works, Sunderland.

FLOATING DOCKS—
Chalmers, Wm., & Co., Ltd., Rutherglen, Nr. Glasgow. [Scotland.
Hamilton, Wm., & Co., Ltd., Port Glasgow,
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne.

FLOOR COVERING—
Docker Bros., Ltd., Metropolitan Road, Saltley, Birmingham.

FORCED DRAUGHT—
Adam, J. M., & Co., Greenfield Iron Works, Dalmarnock, Glasgow. [Belfast.
Davidson & Co., Ltd., Sirocco Engineering Works,
Howden, J. & Co., Ltd., Scotland Street, Glasgow.
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

FORGING PRESSES—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Petty, Henry, & Co., Ltd., Croydon Works, Leeds.
Mactaggart, Scott & Co., Ltd., Loanhead, Edinburgh.

FORGINGS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Steel Works, Elswick.
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
Darlington Forge Co., Ltd., Darlington.
Hingley & Sons, Ltd., Netherton Iron Works, Staffs.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

FORGINGS (Bronze)—
Delta Metal Co., Delta Works, East Greenwich, London, S.E.

FORGINGS (Steel)—
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

FUMIGATORS—
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.

FURNACE BRIDGES—
Hamilton, A., & Sons, 13, Bute Crescent, Docks, Cardiff.
McConwell, A., & Co., Ltd., 60, Drury Buildings, Water Street, Liverpool.

FURNACES—
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
Deighton's Patent Flue & Tube Co., Ltd., Vulcan Works, Pepper Road, Leeds.
Leeds Forge Co., Ltd., Leeds.
Piggott, T., & Co., Ltd., Birmingham.

FUSES—
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

GALLEY GEAR—
Grieve, T., & Sons, Bedford Street, North Shields.

GALVANIZERS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

GAS ENGINES—
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Mather & Platt, Ltd., Manchester.

GAUGES—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

GEAR CUTTING—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds

GEARING—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

GEARS—
Spencer, John, & Sons, Ltd., Newburn-on-Tyne

GEARS (Noiseless or Silent)—
British Thomson-Houston Co., Ltd., Rugby.
Brown, David, & Sons (Hfd.), Ltd., Huddersfield.

GOVERNORS—
Aspinall's Patent Governor Co., 7, Strand Street, Liverpool.

GRINDING MACHINES—
Greenwood & Batley, Ltd., Albion Works, Leeds.

GRINDING WHEEL MACHINES—
Sterne, L., & Co., Ltd., Crown Iron Works, Glasgow

HEATING APPARATUS—
Ashwell & Nesbit, Ltd., Barkby Lane, Leicester.
Kelvin, Bottomley & Baird, Ltd., 16, 18, 20, Cambridge Street, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.
Saunders & Taylor, Ltd., 43, Lower Mosley Street, Manchester.

HEATING ENGINEERS—
Ashwell & Nesbit, Ltd., Barkby Lane, Leicester.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Matthews & Yates, Ltd., Swinton, Manchester.
Royles Ltd., Irlam, Nr. Manchester.
Saunders & Taylor, Ltd. 43, Lower Mosley Street, Manchester.

HELM SIGNAL TELEMOTORS—
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh

HIGH SPEED DRILLS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Brown, John, & Co., Atlas Works, Sheffield.

HIGH SPEED STEEL—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Openshaw Works, Manchester.
Brown, John, & Co., Atlas Works, Sheffield.

HOISTS—
Mather & Platt, Ltd., Manchester.
Waygood-Otis, Ltd., Falmouth Road, S.E.

BUYERS' GUIDE—*continued.*

HOSE—
[Bermondsey, London, S.E.
Heinke, C. E., & Co., 88, 89, Grange Road,

HYDRAULIC CRANES—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Engine Works, Elswick.
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Brown Brothers & Co., Ltd., Rosebank Iron Works, Edinburgh.
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh

HYDRAULIC MACHINERY—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Waygood-Otis, Ltd., Falmouth Road, S.E.

HYDRANTS—
McRobie, John, & Sons, 94, Elliott Street,

INDIARUBBER—
Cranstonhill, Glasgow.
Heinke, C. E., & Co., 88, 89, Grange Road,

INDICATORS—
Bermondsey, London, S.E.
Robinson, A., & Co., Ltd., Bootle, Liverpool.

INDUCED DRAUGHT—
Davidson & Co., Ld., Sirocco Eng'n'g W'rks, Belfast
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

INSULATIONS—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.
[Liverpool.
Liverpool Refrigeration Co., Ltd., Colonial House,

IRON ROOFS AND BUILDINGS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

JOINTING MATERIAL (Manganesite)—
Hudson & Co.'s Successors, John, 15, Victoria Warehouses, Mansell Street, E.C.

LAMPS AND LIGHTS—
Grieve, T., & Sons, Bedford Street, North Shields.
Kaye, Joseph, & Sons, Ltd., Leeds.
Kelvin, Bottomley & Baird, Ltd., 16, 18, 20,

LATHES—
Cambridge Street, Glasgow.
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.

LAUNCHES—
Chambers, John, Ltd., Lowestoft.
Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Renfrew, Scotland.
Livingstone & Cooper, Ltd., Hessle, Hull.
MacLaren Bros., Ltd., Dumbarton.
Perman & Co. Ltd., 82-83, Fenchurch St., E.C.
Seamless Steel Boat Co., Ltd., Wakefield.
Thornycroft, John I., & Co., Ltd., Caxton House, Westminster, London, S.W.
Watson, J. S., Gainsborough.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

LAUNDRY MACHINERY—
Bradford, T., & Co., Salford, Manchester.

LAVATORY FITTINGS AND APPLIANCES—
Levick, John, Alma Street, Aston, Birmingham.

LEAD (Sheets and Pipes)—
Rimer Bros., Newcastle-on-Tyne.

LEAD (White and Red)—
Rimer Bros., Newcastle-on-Tyne.

LIFEBELTS AND BUOYS—
Speedings Ltd., Sail Works, Sunderland.

LIFTS (Window)—
Laycock, W. S., Ltd., Victoria Works, Millhouses,

LIFTS AND HOISTS—
Sheffield.
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh
Waygood-Otis, Ltd., Falmouth Road, S.E.

LIGHTERAGE—
Alexander, W. H. J., St. John's Wharf, Wapping, E.

LIGHTERS—
[Glasgow.
Chalmers, Wm., & Co., Ltd., Rutherglen, Nr.
Crichton, J., & Co., Saltney Shipyard, Chester.
Watson, J. S., Gainsborough.

LOCKS—
Kaye, Joseph, & Sons, Ltd., Leeds.

LOCOMOTIVE TUBES (Copper & Brass)—
The Yorkshire Copper Works, Ltd., Leeds.

LUBRICATORS—
[Cranstonhill, Glasgow.
McRobie, John, & Sons, 94, Elliott Street,

MACHINE TOOLS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Openshaw Works, Manchester.
Campbells & Hunter, Ld., Dolphin Foundry, Leeds.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Scriven & Co., Leeds Old Foundry, Leeds.

MACHINERY NAME PLATES—
Brown, Robert, & Co., 12, Espedair St., Paisley.

MAGNESIA—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.

MARINE ENGINEERS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-on-Tyne.
Bailey, C. H., Newport, Mon.
[Barry Docks.
Barry Graving Dock & Engineering Co., Ltd.,
Brown, John, & Co., Ltd., Clydebank, Nr. Glasgow.
Chambers, John, Ltd., Lowestoft.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.
[Southampton.
Day, Summers & Co., Ltd., Northam Ironworks,
Delegación de la Compañia Trasatlantica, Cadiz.
Diamond, Thos., & Co., Cardiff.
Doxford, Wm., & Sons, Ltd., Sunderland.
Elliot & Jeffery, East Dock, Cardiff.
Gray, Wm., & Co., Ltd., West Hartlepool.
Harland & Wolff, Ltd., Belfast.
Harris Bros., Ltd., Cambrian Dry Docks, Swansea.
Hawthorne, R. & W., Leslie & Co., Ltd., Hebburn-on-Tyne.
Hill's Dry Docks & Engineering Co., Ltd., Cardiff.

MARINE ENGINEERS *(contd).—*
Isherwood, J. W., 4, Lloyd's Avenue, London, E.C.
Livingstone & Cooper, Ltd., Hessle, Hull.
Mountstuart Dry Docks, Ltd., Cardiff.
Perman & Co., Ltd., 82-83, Fenchurch St., E.C.
Shearman, John, & Co., Ltd., Cardiff.
Simons, Wm., & Co., Ltd., Renfrew, Nr. Scotland.
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne.
[Westminster, S.W.
Thornycroft, John I., & Co., Ltd., Caxton House,
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.
Workman Clark & Co., Ltd., Belfast.
Yarrow & Co., Ltd., Glasgow.

MARINE GOVERNORS—
Aspinall's Patent Governor Co., 7, Strand Street,

MARKING-OFF TABLES—
Liverpool
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

MATTRESSES—
Stewart, Archibald, & Co., 40-48, Union St., Glasgow

METALLIC PACKING—
McConnell, A., & Co., Ltd., 60, Drury Buildings, Water Street, Liverpool.
United States Metallic Packing Co., Ltd., Bradford

METAL SPINNINGS—
Levick, John, Alma Street, Aston, Birmingham.

METALS (Patent)—
Bowran, Robt., & Co., Ltd., Newcastle-on-Tyne.
Delta Metal Co., Ltd., Delta Works, East

MILLING CUTTERS—
Greenwich.
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.

MOTOR BOATS—
Chambers, John, Ltd., Lowestoft.
Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Renfrew, Scotland.
Livingstone & Cooper, Ltd., Hessle, Hull.
Perman & Co., Ltd., 82-83, Fenchurch St., E.C.
Seamless Steel Boat Co., Ltd., Wakefield.
Thornycroft, John I., & Co., Ltd., Caxton House, Westminster, London, S.W.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

MOTOR STARTING AND CONTROL GEAR—
[on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

NAVAL ARCHITECTS' SUPPLIES—
Walker, Jas., & Co., 11, Bishop Court, Anderston,

OIL CANS—
Glasgow.
Kaye, Joseph, & Sons, Ltd., Leeds.

OIL ECONOMISERS—
Kaye, Joseph, & Sons, Ltd., Leeds.

OIL ENGINES—
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Edina Manufacturing Co., 19b, Broad Wynd, Leith.
Perman & Co., Ltd., 82-83, Fenchurch Street, E.C.
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne.
Thornycroft, John I., & Co., Ltd., Caxton House, Westminster, S.W.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

OIL-FUEL INSTALLATION—
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

OIL IMPORTERS & BLENDERS—
Rimer Bros., Newcastle-on-Tyne.

PACKING—
Beldam Packing & Rubber Co., Ltd., 1 and 2, Gracechurch Street, London, E.C.
Walker, Jas. & Co., Ltd., Lion Works, Garford Street, West India Dock Road, E

PAINTS—
Briggs, W., & Sons, Ltd., Dundee.
Cocks, Harry, & Co., Cardiff.
Hamilton, Archd., & Co., Possilpark, Glasgow.
Hoyle, Robson, Barnett, & Co., Ltd., St. Nicholas Chambers, Newcastle-on-Tyne.
Wailes, Dove & Co., Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.
Websters Ltd., Hull.

PANELLING—
Stewart, Archibald, & Co., 40-48, Union St., Glasgow

PATENT HAWSE PIPE AND DECK FLANGE—
Hamilton, A., & Sons, 13, Bute Crescent, Docks, Cardiff.

PERFORATED METALS—
Braby F., & Co., Ltd., Eclipse Works, Glasgow.
Piggott, T., & Co., Ltd., Birmingham.

PIPES—
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.
The Yorkshire Copper Works, Ltd., Leeds.

PLANING MACHINES for Plate Edges—
Scriven & Co., Leeds Old Foundry, Leeds.

PLATE BENDING ROLLS—
Scriven & Co., Leeds Old Foundry, Leeds.

PORCELAIN ENAMELLED CAST IRON—
Levick, John, Alma Street, Aston, Birmingham.

PROPELLERS—
Billington & Newton, Ltd., Longport, Staffs.
Chambers, John, Ltd., Lowestoft.
[Liverpool,
Crichton, C. & H., Ltd., Huskisson Engine Works.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

PROPELLER BLADES—
Billington & Newton, Ltd., Longport, Staffs.
Darlington Forge Co., Ltd., Darlington.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

PUBLICATIONS—
"Shipbuilding and Shipping Record," Queen Anne's Chambers, Westminster, London, S.W.

PULLEY BLOCKS—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.
Higginson & Co., 7, Hurst Street, Liverpool.
Loveridge, Ltd., Cardiff.
Wright, Joseph, & Co., Ltd., Tipton, Staffs.

PUMPING ENGINES—
Central Marine Engine Works, West Hartlepool.

PUMPS—
[ing Works, Bedford.
Allen, W. H., Son & Co., Ltd., Queen's Engineer-
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Davey & Co. (London). Ltd, 88, West India Dock Road, E.
Dawson & Downie, Elgin Works, Clydebank.
Edina Manufacturing Co., 19b, Broad Wynd, Leith.
Hall, J. P., & Sons, Ltd., Peterborough.
Mather & Platt, Ltd., Manchester.
Weir, G. & J., Ltd., Cathcart, Glasgow.

PUNCHING AND SHEARING MACHINES—
Scriven & Co., Leeds Old Foundry, Leeds.

RADIATORS—
Ashwell & Nesbit, Ltd., Barkby Lane, Leicester.
British Thomson-Houston Co., Ltd., Rugby.
Low, Archibald, & Sons, Ltd., 73, Merkland Street, Partick, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

RADIATOR TUBES—
The Yorkshire Copper Works, Ltd., Leeds.

REAMERS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

REFRIGERATING MACHINERY—
Hall, J. & E., Ltd., Dartford Ironworks, Kent.
Liverpool Refrigeration Co., Ltd., Colonial House, Liverpool.
Sterne, L. & Co., Ltd., Crown Iron Works, Glasgow

RESCUE APPLIANCES—
Mining Engineering Co., Ltd., Meco Works, Moorfields, Sheffield.

REVERSING ENGINES (Direct-Acting Type)—
[Works, Edinburgh.
Brown Brothers & Co., Ltd., Rosebank Iron
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh

RHEOSTATS & RESISTANCES (all kinds)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
[on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

ROPE-CUTTING MACHINES—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.

ROPES (Wire)—
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.

ROUND AND OVAL HOLE CUTTING-OUT MACHINES—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

RUBBER GOODS—
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.

RUBBER HOSE—
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.

RUSTLESS IRON—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

SAFE MANUFACTURERS—
Whitfield's Safe & Door Co., Oxford Street,

SALOON LIGHTS—
Birmingham.
Callender's Cable & Construction Co., Ltd., Belvedere, Kent.
Laycock, W. S., Ltd., Victoria Works, Millhouses,

SALVAGE—
Alexander, W. H. J., St. John's Wharf, Wapping, E.

SANITARY FITTINGS AND APPLIANCES—
Levick, John, Alma Street, Aston, Birmingham.

SCREWING MACHINES—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

SHAFTING—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

SHAPING MACHINES—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Greenwood & Batley, Ltd., Albion Works, Leeds.

SHEAVES—
Higginson & Co., 7, Hurst Street, Liverpool.

SHEERS, TRAVERSING (Land and Floating)—
Day, Summers & Co., Ltd., Northam Ironworks, Southampton.

SHIP APPLIANCES—
Linkleter's Patent Ship Fittings Co., 20, Percy Street, Tynemouth.

SHIP BROKERS—
Hall, Edward, Cardiff.
Pinkney, Thos., & Sons, Sunderland.
Walford, Leopold & Co., 29, Gt. St. Helens, E.C.

BUYERS' GUIDE—*continued.*

SHIPBUILDERS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Brown, John, & Co., Ltd., Clydebank, Nr. Glasgow.
Chambers, John, Ltd., Lowestoft.
Crichton, J., & Co., Saltney Shipyard, Chester.
Day, Summers, & Co., Ltd., Northam Ironworks, Southampton.
Doxford, Wm., & Sons, Ltd., Sunderland.
Gray, Wm., & Co., Ltd., West Hartlepool.
Hamilton, Wm., & Co., Ltd., Port Glasgow.
Harland & Wolff, Ltd., Belfast.
Isherwood, J. W., 4, Lloyd's Avenue, London, E.C.
Simons, Wm., & Co., Ltd., Renfrew, Nr. Scotland.
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne. [Westminster, S.W.
Thornycroft, John I., & Co., Ltd., Caxton House,
White, J. Samuel, & Co., Ltd., East Cowes, I.W.
Workman Clark & Co., Ltd., Belfast.
Yarrow & Co., Ltd., Glasgow.

SHIP CONSTRUCTION—
Brown, John, & Co., Ltd., Clydebank, Nr. Glasgow.
Isherwood, J. W., 4, Lloyd's Avenue, London, E.C.
Simons, Wm., & Co., Ltd., Renfrew, Nr. Scotland.

SHIP FURNISHINGS & FITTINGS—
Cooks, Harry, & Co., Cardiff.
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield. [Street, North Shields.
Linkleter's Patent Ship Fittings Co., Hudson
Loveridge, Ltd., Cardiff.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow. [Liverpool.
Metallic Valve Co., Colonial House, Water Street,
Stewart, Archibald, & Co., 40-48, Union Street, Glasgow.
Waygood-Otis, Ltd., Falmouth Road, S.E.

SHIP LAVATORIES—
Stewart, Archibald, & Co., 40-48, Union St., Glasgow

SHIP PLATES (Steel)—
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

SHIP REPAIRERS—
Bailey, C. H., Newport, Mon.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool. [Southampton.
Day, Summers & Co., Ltd., Northam Ironworks,
Diamond, Thos., & Co., Cardiff.
Doxford, Wm., & Sons, Ltd., Sunderland.
Elliot & Jeffery, East Dock, Cardiff.
Gray, Wm., & Co., Ltd., West Hartlepool.
Grayson, H. & C., Ltd., Royal Liver Building, Liverpool.
Harland & Wolff, Ltd., Belfast.
Hawthorne, R. & W., Leslie & Co., Ltd., Hebburn-on-Tyne.
Hill's Dry Docks & Engineering Co., Ltd., Cardiff.
Shearman, John, & Co., Ltd., Cardiff.
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne.
Yarrow & Co., Ltd., Glasgow.

SHIPS' ELECTRIC FITTINGS—
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

SHIPS' LAUNDRIES— Sunderland Forge & Engineering Co., Ltd., Sunderland.
Bradford, T., & Co., Salford, Manchester.

SHIPS' TELEGRAPHS—
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.
Robinson, A., & Co., Ltd., Bootle, Liverpool.

SIGNAL FLASHING AND CABIN LAMPS—
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.

SILICATE-COTTON SPECIALITIES— [Glasgow.
Walker, Jas., & Co., 11, Bishop Court, Anderston,

SKYLIGHT & LIFTING GEARS—
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.

SLAG WOOL (Silicate Cotton)—
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.

SLEWING GEAR (for Ships' Derricks)—
Edina Manufacturing Co., 19b, Broad Wynd,

SMITHS' HEARTHS— Leith.
Keith, James, & Blackman Co., Ltd., 27, Farringdon

SOLDER— Avenue, London, E.C.
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

SOUNDING MACHINES—
Kelvin, Bottomley & Baird, Ltd., 16, 18, 20, Cambridge Street, Glasgow.

SPEAKING TUBES—
Durham, Churchill & Co., Grimesthorpe, Sheffield.

SPELTER—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

SPIRAL SPRINGS—
Cockburns Ltd., Cardonald, Nr. Glasgow.
Sterne, L., & Co., Ltd., Crown Iron Works, Glasgow.

STAMPINGS— [Steel Works, Elswick.
Armstrong, Sir W. G., Whitworth & Co., Ltd.,
Delta Metal Co., Ltd., East Greenwich.

STAYBOLTS—
Hingley & Sons, Ltd., Netherton Iron Works, Dudley, Staffs.

STEAM-FITTING MANUFACTURERS—
Billington & Newton, Ltd., Longport, Staffs.
Royles Ltd., Irlam, Nr. Manchester.

STEAM-HEATING—
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

STEAM KETTLES—
Royles Ltd., Irlam, Nr. Manchester.

STEAM PIPES—
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.
Yorkshire Copper Works, Ltd., Leeds.

STEAM TRAPS—
Cockburns Ltd., Cardonald, Nr. Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

STEAM TURBINES—
Belliss & Morcom, Ltd., Birmingham.
British Thomson-Houston Co., Ltd., Rugby
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Howden, James, & Co., Ltd., Scotland St., Glasgow.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

STEAMSHIP SPECIALITIES—
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield. [Liverpool.
Metallic Valve Co., Colonial House, Water Street,

STEEL—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Openshaw Works, Manchester.
Brown, John, & Co., Atlas Works, Sheffield.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

STEEL BARGES—
Crichton, J., & Co., Saltney Shipyard, Chester.
Watson, J. S., Gainsborough.

STEEL BOATS—
Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Renfrew, Scotland.
Seamless Steel Boat Co., Ltd., Wakefield.

STEEL MAKERS—
Brown, John, & Co., Atlas Works, Sheffield.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

STEEL PLATES AND SHEETS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

STEERING-GEAR— [Works, Edinburgh.
Brown Brothers & Co., Ltd., Rosebank Iron
Chambers, John, Ltd., Lowestoft.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.
Hastie, John, & Co., Ltd., Greenock.
Higginson & Co., 7, Hurst Street, Liverpool.

STEERING GEAR (Buffers)—
Loveridge, Ltd., Cardiff.

STEERING TELEMOTORS—
Brown Brothers & Co., Ltd., Rosebank Iron Works, Edinburgh.
Mactaggart, Scott & Co., Ltd., Loanhead, Edinburgh

STOCKS AND DIES—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

STORES (Ship)—
Walker, Jas., & Co., 11, Bishop Court, Anderston, Glasgow.

STRONG ROOM MANUFACTURERS—
Whitfield's Safe & Door Co., Oxford St., Birmingham

STRONG ROOM DOOR MANUFACTURERS—
Whitfield's Safe & Door Co., Oxford St., Birmingham

STRUCTURAL ENGINEERS—
Braby, F., & Co., Ltd., Eclipse Works Glasgow.

SUPERHEATERS—
Central Marine Engine Works, West Hartlepool.
Superheater Corporation, Ltd., Palace Chambers, 9, Bridge Street, Westminster, S.W

SUSPENSION BULB FURNACE—
Leeds Forge Co., Ltd., Leeds.

SWINGBRIDGES—
Armstrong, Sir W. G., Whitworth & Co., Ltd.,

SWITCHBOARDS— Engine Works, Elswick.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Holmes, J. H., & Co., Portland Road, Newcastle-
Mather & Platt, Ltd., Manchester. on-Tyne.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.
Sunderland Forge & Eng'r'ing Co., Ld., Sunderland.

SWITCHGEAR & INSTRUMENTS—
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

SYRENS—
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

TANK TOP COVERING—
Hamilton, Archd., & Co., Possilpark, Glasgow.
Wailes Dove Bitumastic Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.

TANKS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Mather & Platt, Ltd., Manchester.

TARPAULINS—
Spearings, Ltd., Sail Works, Sunderland.

TELEPHONES—
Graham, Alfred, St. Andrew's Works, Crofton Park Road, S.E.
Kelvin, Bottomley & Baird, Ltd., 16, 18, 20, Cambridge Street, Glasgow.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.

TESTING MACHINES—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.

TIMEPIECES—
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.
Kelvin, Bottomley & Baird, Ltd., 16, 18, 20, Cambridge St., Glasgow.

TOOL STEEL—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Brown, John, & Co., Atlas Works, Sheffield.

TOWAGE—
Alexander, W. H. J., St. John's Wharf, Wapping, E.
Tilbury Contracting & Dredging Co., Ltd., Queen Anne's Chambers, Westminster, London, S.W.

TUBE PLATE CUTTING-OUT MACHINES—
Campbells & Hunter, Ld., Dolphin Foundry, Leeds.

TUBES—
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.
Royles Ltd., Irlam, Nr. Manchester.
The Yorkshire Copper Works, Ltd., Leeds.

TUBES (Brass and Copper)—
Yorkshire Copper Works, Ltd., Leeds.

TURBINE OIL—
Rimer Bros., Newcastle-on-Tyne.

TURBINES—
Belliss & Morcom, Ltd., Birmingham.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Hawthorne, R. & W., Leslie & Co., Ltd., St. Peter's, Newcastle-on-Tyne.
Mather & Platt, Ltd., Manchester.

TWIST DRILLS—
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Brown, John, & Co., Atlas Works, Sheffield.
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

UPHOLSTERERS—
Stewart, Archibald, & Co., 40-48, Union St., Glasgow

VACUUM CLEANERS—
The British Vacuum Cleaner Co., Ltd., 77, Parsons Green Lane, Fulham, S.W.

VALVES—
Cockburns Ltd., Cardonald, Nr. Glasgow.
Mather & Platt, Ltd., Manchester.
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow. [Liverpool.
Metallic Valve Co., Colonial House, Water Street,
Royles Ltd., Irlam, Nr. Manchester.

VALVE RE-SEATER—
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Greenwood & Batley, Ltd., Albion Works, Leeds.

VENTILATORS—
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Grieve, T., & Sons, Bedford Street, North Shields.
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield.
Loveridge, Ltd., Cardiff.
Low, Archibald, & Sons, Ltd., 78, Merkland St.,

WAR MATERIAL— Partick, Glasgow.
Armstrong, Sir W. G., Whitworth & Co., Ltd., Ordnance, Elswick.
Brown, John, & Co., Atlas Works, Sheffield.

WELDING & CUTTING—
Carbic Ltd., 51, Holborn Viaduct, London, E.C.

WINCHES— [ing Works, Bedford.
Allen, W. H., Son & Co., Ltd., Queen's Engineer-
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.
Higginson & Co., 7, Hurst Street, Liverpool.
Sunderland Forge & Engineering Co., Ltd.,

WINDLASSES— Sunderland.
Chambers, John, Ltd., Lowestoft.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.
Edina Manufacturing Co., 19b, Broad Wynd, Leith.

WIRE-ROPE COMPRESSORS—
Edina Manufacturing Co., 19b, Broad Wynd, Leith.

WOOD-WORKING MACHINERY—
Adam, J. M., & Co., Greenfield Iron Works, Dalmarnock, Glasgow.
Wadkin & Co., North Evington, Leicester.

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Campbells & Hunter, Ltd., Dolphin Foundry, Leeds

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Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Renfrew, Scotland.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.
Yarrow & Co., Ltd., Glasgow.

ZINC—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

ALPHABETICAL INDEX TO ADVERTISERS.

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Classified Index to Advertisers will be found on pages 15, 16, 17 and 18.

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